NATIONAL MUSEUM OF VICTORIA

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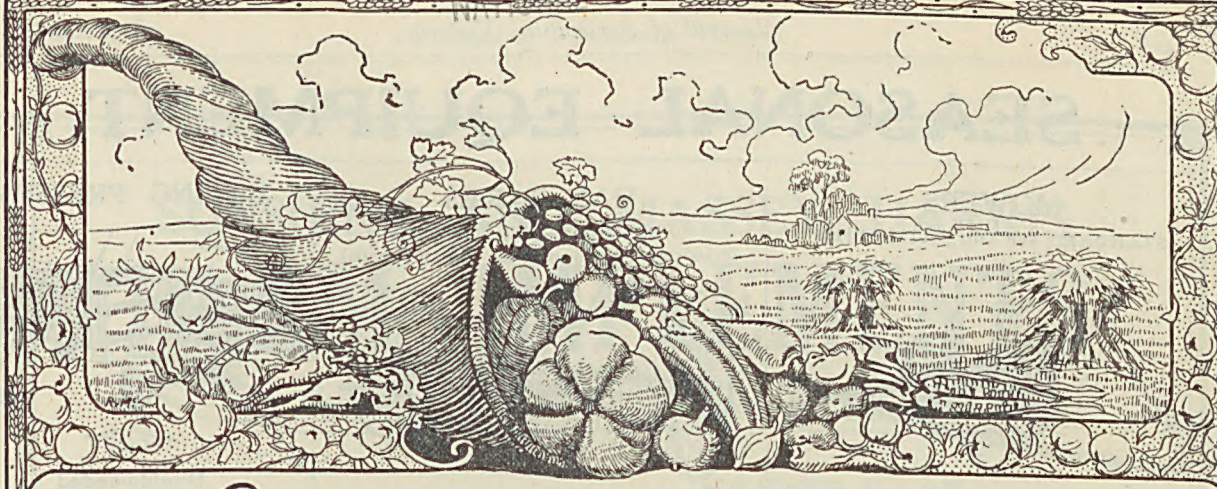

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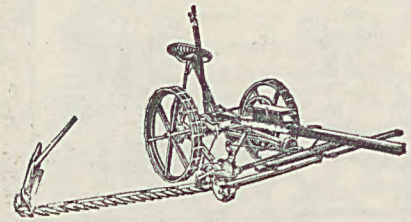

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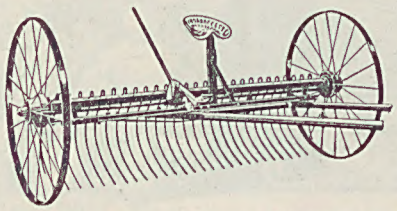

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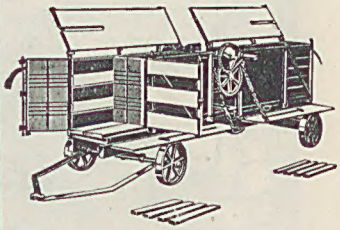

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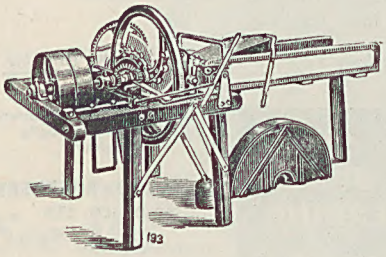

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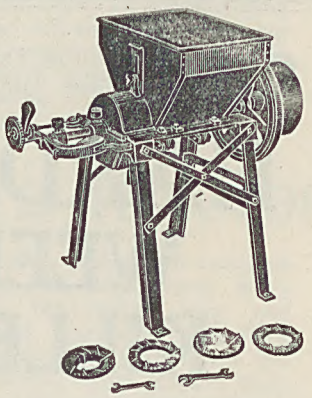

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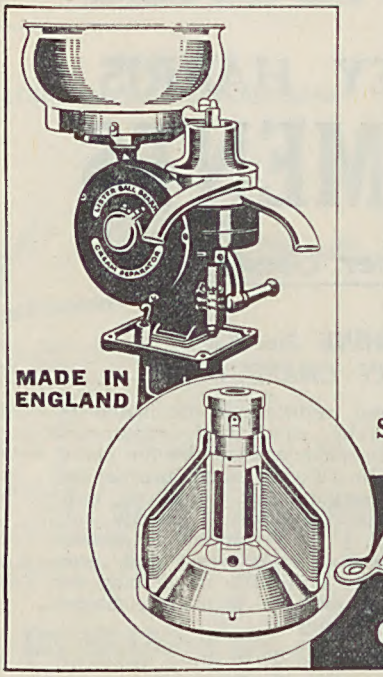

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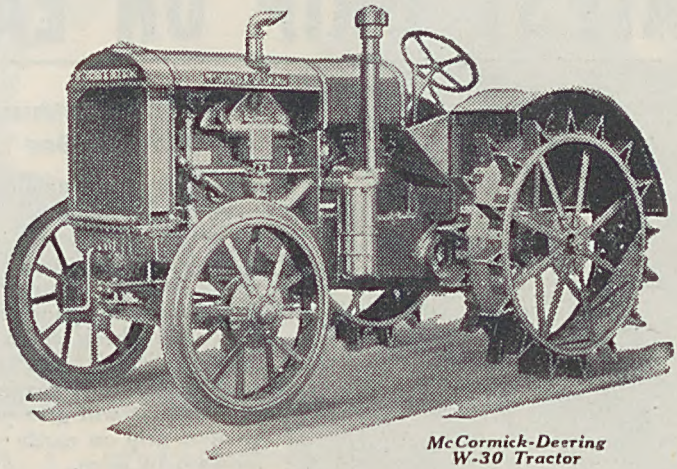

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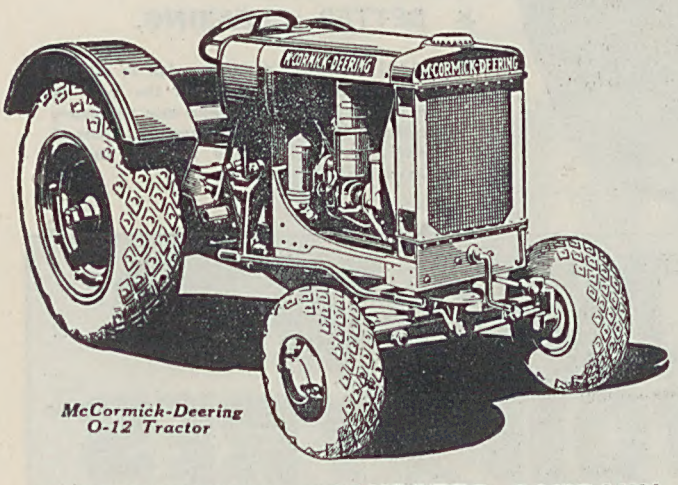

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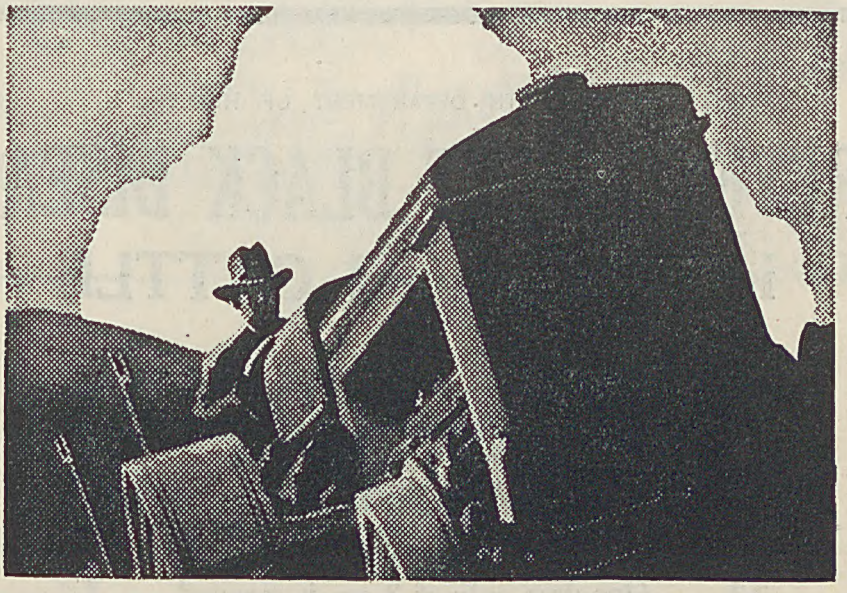

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The Journal of the DEPARTMENT of AGRICULTURE of VICTORIA

Subterranean Clover

By J. E. Harrison, B.Agr.Sc., Agrostological Research Officer

SUBTERRANEAN clover (*Trifolium subterraneum*) has become a pasture legume of first importance in the temperate regions of southern and eastern Australia. In its native habitats of Europe, Asia, and Africa, it has received no recognition in agriculture, and its rise to first place as a pasture legume over a wide area of Australia must be regarded as one of the outstanding examples of new plant utilization of this century.

There is no record of its introduction, which is, therefore, assumed to have been accidental. Since the plant was apparently fairly widespread 40 years ago, and since numerous strains have been found voluntarily established in various parts of Australia, it may be assumed also that its chance introduction took place frequently and at several ports during the first 50 years or so of occupation. The possible means of importation are numerous and probably include such mediums as hay, straw, packing, and agricultural seeds which were not of such high purity as they are today.

As the plant is self-fertile, even a single seed might have been the means in some instances of securing the establishment of the species in various isolated localities. Once established it would spread farther year by year in each locality, and would eventually be carried from one locality to another through the agency of travelling stock, flood waters, hay, or chaff. It is known that unbroken seeds may pass unharmed through the alimentary tract of farm animals, especially cows and horses, and that the burr may cling to the wool of sheep, so that the subsequent distribution of the species from the point of introduction would be an easy matter.

The absence of clover from our native grasslands, and the small success, in dry districts, with the common white clover, red clover, and alsike of commerce, were no doubt the reasons for the search by pioneer farmers, with a traditional belief in the value of clovers, for a species that would flourish in the pastures of this new country.

It was the late Mr. A. Howard, of Mount Barker, South Australia, who recognized the possibilities of subterranean clover and set about its cultivation. The soundness of his judgment is evidenced by the extensive and increasing use of the plant in temperate Australia today.

Present Distribution.

With Mount Barker, South Australia, as the first centre of development and seed production, the cultivation of subterranean clover has spread east and west. In both coastal and sub-coastal districts receiving about twenty inches or more of rain annually, with the main precipitation in winter, the plant has become the principal means, under phosphatic top-dressing, of increasing production and raising soil fertility.

The zone of distribution now lies approximately between the 20-inch line of rainfall and the coast, and south of latitude 30 deg. S. It extends from New South Wales through Victoria and Tasmania to the south-east of South Australia, where it disappears with the coast and rises again in Western Australia, to run in a broad belt towards Geraldton across the south-west division of that State.

In New South Wales, subterranean clover (the Mount Barker strain) is successfully grown in districts receiving not less than an average

rainfall of 21 inches annually, of which the main part falls in winter. The same average generally is required by this strain in Victoria, Tasmania, and South Australia, although there are cases in this State where the commercial strain has been introduced and maintained under seventeen-inch rainfall conditions. In Western Australia, somewhat less than 21 inches are sufficient, apparently because a more strictly winter type of rainfall prevails, and almost the whole precipitation occurs during the growing period (April to October).

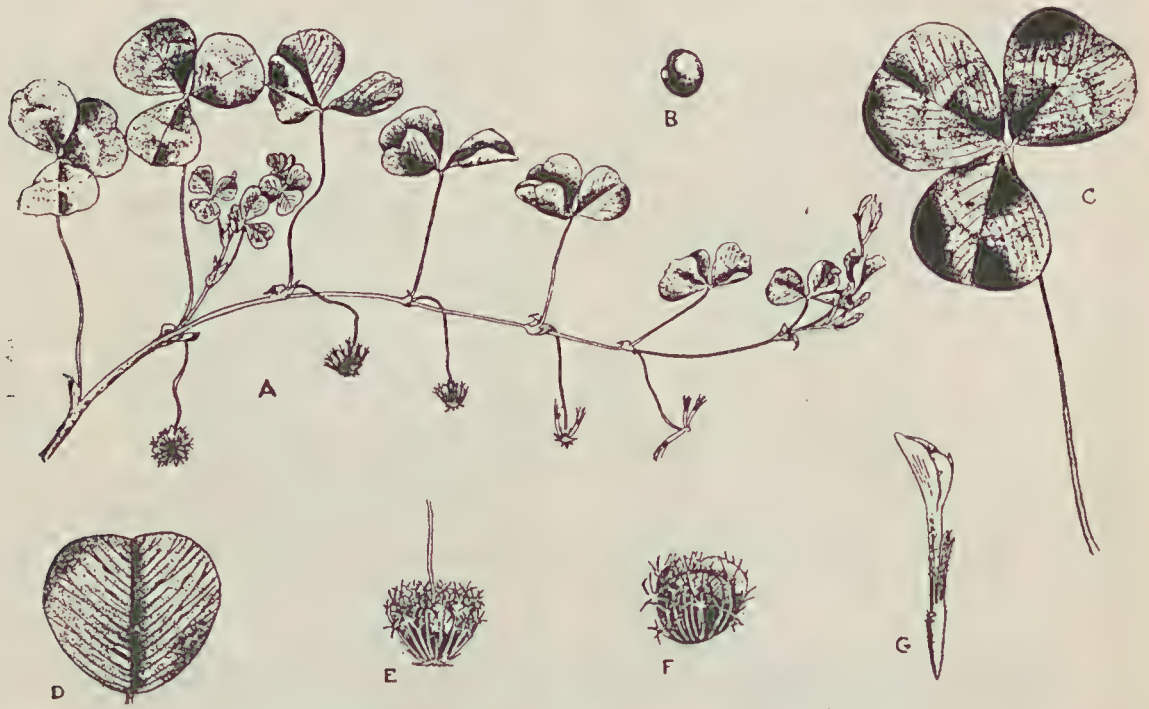
A *combination* of winter rainfall and summer drought is most favorable to growth, and the species has made most progress in areas where these conditions prevail. In the zone of summer rainfall and winter drought (northern New South Wales and Queensland) the species has not been successfully grown, making poor development during the rainy season, being subject to rust attack, and failing to re-establish itself satisfactorily. Another factor operating against it in regions of summer rainfall is the partial failure of the seed to germinate at high temperatures, even though abundant rain may fall. In the zone of good uniform rainfall, where summer as well as winter rains occur, as in the south-east of New South Wales and eastern Victoria, the species thrives best on those soils which dry out in summer and fail to support a full sward of perennial plants. On flat lands, with retentive soils, the species is superseded in time by the perennials, white and strawberry clover, which take possession of the land while the annual is dormant in summer.

Description of the Plant.

Subterranean clover is an annual. Its normal habit is to grow from seed in the autumn, and after flowering and setting seed, to die in the late spring.

The stems are weak and prostrate. The leaves are trifoliate, the three leaflets being broadest towards the apex. They may be marked with a white crescent, and are usually, though not always, flecked with black. Both stems and leaves are usually more or less hairy, the leaves being more hairy on the under surface than on the upper surface.

The flower heads are produced on short stalks arising from the axils of the leaves. Each flower-head usually consists of a cluster of three



Subterranean Clover (Trifolium subterraneum)

A.—Portion of plant showing habit and development. B.—Seed. C.—Leaf showing white crescent-shaped markings. D.—Leaflet showing black flecking. E.—Maturing seed head. F.—Ripe burr. G.—Flower head.
[West. Aust. Dept. of Agric.]

Subterranean clover (Dwalganup strain) and Phalaris tuberosa in the light rainfall country of South Australia.

small flowers, with creamy white, sometimes pink-petals. The calyx may be green or white, and sometimes banded or tipped with red. After fertilization, the flowers fold back along the flower stalk, which turns downwards to the ground, grows in length, and presses the developing seed-head into the soil. At the same time, several small processes arise from the tip of the stalk, and, after branching, grow back over the seed-head to form a burr.

Each flower is hermaphrodite and self-fertile, and gives rise to a one-seeded pod. The keel, or that part of the flower which envelops the sexual elements, does not normally open and is not normally visited by insects. Self-fertilization takes place within the unopened keel, and a single seed develops.

This provision of self-fertilization has two important results—

(*a*) the plants of each strain breed very true to type; and.

(*b*) the spread of the species may be effected by the dispersal of single seeds only; one isolated plant is capable of perpetuating the species and colonizing new territory.

Subterranean Clover as a Pasture Plant.

Though an annual, subterranean clover is thoroughly persistent in permanent pasture, maintaining itself from year to year as a self-sown crop. There are only a few favoured areas where perennial grasses and perennial clovers comprise permanent pasture in our fields, and most of our grazing lands will adequately support only an annual clover with introduced perennial grasses, introduced annual grasses, or the native perennial grasses.

It must be recognized that, for grazing purposes, an annual clover is invested with certain disadvantages, as it naturally fails to provide green feed in summer, and affords no autumn grazing until from four to six weeks after germination. But, since our grazing lands largely fail to support perennial clovers satisfactorily—at least in competition with perennial grasses—there is no escape from the use of an annual clover, and its disadvantages must be suffered. The first disadvantage is largely offset in subterranean clover by the high feeding value of its burrs, which remain, together with the dry haulms, after maturity; and both disadvantages are partly overcome if a perennial grass, capable of some summer growth, is present in the pasture. Where a perennial grass cannot be established or fails to make summer growth, the situation may often be relieved by the cultivation of lucerne as a summer fodder crop.

Where a perennial clover will flourish and provide a continuity of green feed, it is to be preferred and ought to be sown down. Only a relatively limited area will support such a clover, however, and, whatever its limitations, subterranean clover offers the greatest means of extensive pasture improvement in the farm and pastoral areas of southern Australia. It is easily established and maintained, and it greatly improves soil fertility. It withstands hard grazing, and will grow in association with both perennial and annual grasses to their ultimate benefit. It makes prolific growth under proper

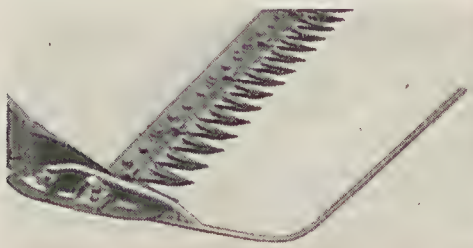
manurial treatment, and its cultivation will double and even treble the production of great areas of both dairying and grazing land.

For Hay or Ensilage.

Fields of subterranean clover make prolific spring growth, greatly in excess of the immediate grazing needs of the stock normally carried on the farm. Hay making or ensiling is essential if waste is to be prevented and full use is to be made of the great bulk of feed produced.

Hay yields vary from about 1 ton to over 3 tons per acre, according to the season, district, rainfall, manurial treatment, and management. From 2 to 2½ tons per acre is an average crop on well manured land in districts of good rainfall (30 inches or more).

Fields intended for hay are closed in early spring, as soon as the pastures commence to grow away from grazing stock. The time of closing is thus a matter of convenience, and may take place from early September onwards, though seldom later than the end of October. It is characteristic of subterranean clover to increase its height rapidly in spring, perhaps to 18 inches, and then subside suddenly by several inches. It is usually cut for hay at or immediately after this period of subsidence, or somewhat earlier if intended for silage.



Clover attachment fitted to the cutter bar of a mower.

A mower with a rapid knife action is most suitable for cutting the crop. As the clover runners are closely intertwined and matted together, it is difficult to separate the swath from the standing crop, and an effective "divider" has been made by agricultural implement makers especially for the purpose.

As the swath turns the rain well, it is usual in wet districts to let the crop lie in the swath until it is cured and ready to cart in. In other respects hay-making is done as for other common hay crops.

Burrs for Summer Feed.

It is doubtful whether full advantage is taken, at present, of the grazing value of the burrs of subterranean clover. In districts with a 25-in. rainfall, seed yields of 250 to 300 lb. per acre are obtained from fields which have been moderately grazed throughout the spring, and it follows that the same amount of seed should be available, from similar fields, as feed throughout the summer months. It is doubtful if it is ever obtained, and its loss is no doubt largely due to the fact that most of the burr is buried and out of the reach of the grazing animal. The burr is buried most deeply in light sandy soils, and under conditions of close grazing. The possibility of bringing the burr to the surface by harrowing or other form of light cultivation is suggested as practicable.

A heavy crop does not bury many burrs, apparently because the flower stalks are not long enough to reach the soil from the upper layers of runners. A heavy crop, however, is unsuitable for sheep grazing, and the practice in some districts of running sheep on such fields in early spring when the sward is short, turning in fattening cattle as growth advances, and finally of running sheep on the field again during the summer months appears to be a satisfactory method of controlling grazing and taking full advantage of both the green crop and the crop of burrs.

The early strains of subterranean clover are prone to bury their burrs deeply, apparently because the soil is usually soft during their fruiting season and offers little resistance to the burial of the burrs. The soil hardens as dry weather advances, and later maturing strains are less able to bury their burrs, which are, therefore, more available as feed when the crop is dry. It is expected that seed of several new strains will go on the market during the next few years, in which case growers will be confronted with the problem of which strain to sow down. The consideration that much of the burr should be available as feed during the summer months is one which points towards the use of as late a strain as the rainfall and soil of a district will adequately support.

Nutritive Value and Mineral Content.

The stage of growth largely determines the protein and mineral content of pasture plants. In the early life of a plant the various processes of growth do not keep pace relatively with the intake of minerals from the soil; and thus we find, by chemical analysis, that plants are richest

in minerals in the early, leafy stage of life. As the flowering stage is approached, fibrous stemmy growth takes place at a relatively greater rate than the intake of minerals by the roots, and thus there occurs a decline in the proportion of minerals in the plant tissues as a whole. The change from a leafy to a stemmy nature is accompanied also by a lowering of the proportion (not of the total amount) of proteins in the plant; and, finally when seeds are formed, there is almost a complete transfer of nutritive substances from the leaves and stems to the seeds themselves. The composition of a plant, and therefore the nutritive value, thus change continuously, and it is necessary to appreciate this fact in a consideration of the nutritive value of subterranean clover.

We are indebted to the Waite Agricultural Research Institute of South Australia for chemical studies of the mineral and protein content of subterranean clover, and the account which follows has been compiled from its report on "Factors affecting the Mineral Content of Pastures," published in 1931.

In order to determine the composition of subterranean clover at different stages of growth, several single plants were cut to ground level on five different occasions, and an analysis was made on a sample of the bulk. The high nitrogen and high equivalent crude protein contents in early life, and their decrease to smaller proportions of the plant in late life, are shown in Table I.

TABLE I.—NITROGEN CONTENT, AND EQUIVALENT CRUDE PROTEIN CONTENT, AT FIVE DIFFERENT STAGES OF GROWTH IN SUBTERRANEAN CLOVER.

Time of Harvest.	Nitrogen.	Equivalent Crude Protein.
	%	%
Early tillering	4·74	29·6
Advanced tillering	4·26	26·6
Flowering	3·69	23·0
Seed setting	2·82	17·6
Maturity	2·50	15·6

It is not known what proportion of the crude protein is digestible, but it is no doubt higher in the succulent early stages than in the later more fibrous stages of growth. From Table I. the very high protein content of the clover at the commencement of tillering, and its fall to about half the original proportion at maturity, become apparent. The analyses were made upon the plants as a whole, and not upon the leaves separately, which are known to be the richest portion of a plant while it is still green. Since, therefore, a grazing animal gathers mostly leaves from a green pasture, it must experience a very rich diet for a time, and undoubtedly one which must be excessively rich if continued over a very long period. Fortunately this does not often occur, and though stock, and especially lambs, may sometimes suffer digestive ailments in early spring, the clover advances quickly towards maturity and the danger period passes fairly rapidly.

The figures in the table are instructive and confirm the general experience of growers that subterranean clover is a rich and nutritious diet, though not necessarily one which is well balanced in all its stages of growth, and for all classes of stock. A few dairy farmers are feeding hay to their cows with beneficial results in early spring, when their pastures are flush with clover. The advantages claimed for the practice would seem to be the outcome of modifying an excessively rich diet. Hay is not high in digestible proteins, and its addition to the diet of an animal grazing on very rich pasture apparently secures a satisfactory balance and prevents scouring and other digestive disturbances while maintaining milk production.

TABLE II.—PHOSPHATE AND LIME CONTENT OF SUBTERRANEAN CLOVER AT VARIOUS STAGES OF GROWTH.

Stage of Growth.	Phosphate P_2O_5.	Lime (CaO).
	%	%
Early tillering	0·71	2·30
Advanced tillering	0·70	2·60
Flowering	0·50	2·17
Seed setting	0·42	2·32
Maturity	0·39	2·31

Further analyses were made of the proportions of phosphate and lime present in the plant at the same five stages of growth as in the previous experiment. (See Table II.) The lime content is evidently maintained at a more or less constant level throughout the life of the plant, but the proportion of phosphate is highest in early life, and subsequently falls off in the same way that the protein content was found to do. The ratio of lime to phosphorus is regarded as higher than that needed by stock. The investigators suggest, in their report, that the evident preference of stock for what grasses there may be in a pasture dominated by subterranean clover is the outcome of a natural endeavour on their part to adjust

the lime-phosphorus ratio of their diet to one more nearly compatible with that of their bodily needs. Stock are found, for example, to selectively graze Wimmera rye-grass when it is growing in a field of subterranean clover. Though the grass contains about the same amount of phosphorus as the clover, it contains only one-third as much lime, and its consumption, therefore, maintains the amount of phosphorus, but reduces the amount of lime taken in by the animal.

Since the nutritive value of a plant depends upon its mineral composition, as well as upon its digestible proteins, carbohydrates and fats, it is interesting to note that the investigations at the Waite Institute included a study of the effect of superphosphate on the mineral content of subterranean clover at the flowering stage. It was found that when plants were grown in a soil typically low in phosphate, they themselves had less phosphorus in their composition than when grown in similar soil to which superphosphate had been added. The increase, though definite, was not so great as in the case of Wimmera rye-grass, and agreed with the previous observation that subterranean clover was less able than Wimmera rye-grass to vary the amount of phosphorus in its composition.

[Further information on subterranean clover will be published in a subsequent issue.]

Book Review

Supplies of Canned and Dried Fruit in 1935.

ACCORDING to "Supplies of Canned and Dried Fruit in 1935", just published by the Imperial Economic Committee as a supplement to their monthly "Canned and Dried Fruit Notes", aggregate imports of canned and bottled fruits, preserved in sugar, and fruit and fruit pulp, preserved without sugar, into the United Kingdom in 1935 reached a record total of over 234,000 tons, with a declared value of £7,200,000. That imports created a record is a statement which applies not only to each of the past three years but also to the average in each successive five-year period since the War, and it seems probable that the extent to which the market will expand has yet to be discovered. The total imports exceeded those of 1934 by about 21,000 tons, or nearly 10 per cent., while the increase over the average for 1929–33 was as much as 40,000 tons, or over 20 per cent. The upward trend in the consumption of imported canned and bottled fruits, which accounted for 185,000 tons of the aggregate total of 234,000 tons, is shown by the fact that the total quantity available per head of the population in 1935, amounting to just under 9 lb., was nearly 3 lb. greater than in 1930.

Supplies from Empire countries have not only been partly responsible for the increase in imports of canned and bottled fruits in recent years, but they have gained a larger share of the market. The Empire contribution has shown a steady rise from an average of under 19,000 tons, 26 per cent. of the total, in the five years following the War to over 50,000 tons, 35 per cent., in 1929–33, and in 1934 it accounted for as much as 76,000 tons, or about 44 per cent. of the total. In 1935 imports from Empire sources, however, were somewhat lighter and, with increased supplies from other sources, chiefly the United States, the Empire's share declined to under 39 per cent., about the same proportion as in 1932 and 1933. Imports from Canada increased slightly and reached a new high level, but supplies from Malaya and Australia, which together provided nearly 89 per cent. of the Empire total, were somewhat smaller. For the first time since they have been separately specified, imports of canned peaches equalled those of pineapples, each accounting for 24 per cent. of the total, while pears took third place with 23 per cent. The Empire supplied 92 per cent. of the pineapples, practically the whole of which came from Malaya, 29 per cent. of the peaches, 27 per cent. of the pears and 33 per cent. of the apricots.

Imports of dried fruits in 1935 amounted to about 180,000 tons, or 6 per cent. more than in 1934, with a declared value of £5,600,000. Raisins and sultanas accounted for 71,000 tons, as against 60,000 tons in the previous year.

The Committee's survey also contains, among other useful information, articles on the production in and exports from each of the principal countries concerned.

Copies of "Supplies of Canned and Dried Fruits in 1935" can be had from H. M. Stationery Office, London. The price, including postage, is 2s. 9d., and to this amount exchange would have to be added, thus making the cost 3s. 6d.

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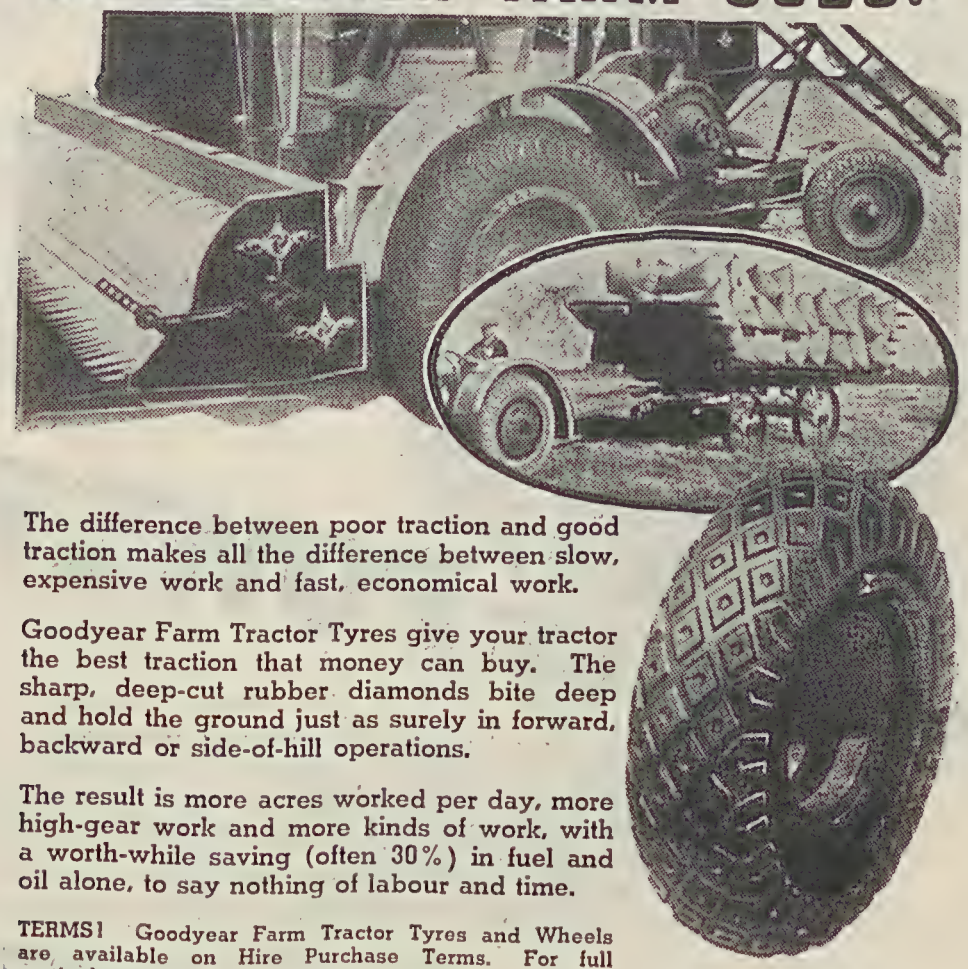

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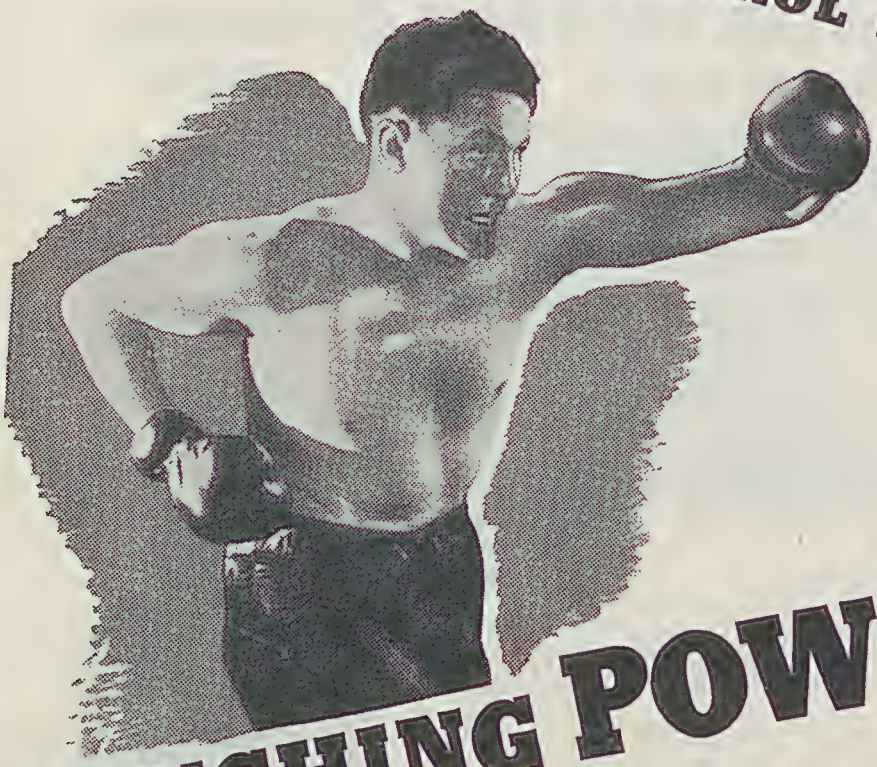

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SUPER PLUME ETHYL

IT'S GOT TO BE
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By A. C. T. Hewitt, M.Agr.Sc., Dairy Herd Manager

ALTHOUGH the problems of hand-feeding farm animals are not so vital in Victoria as in countries where farm stock have to be housed and totally hand-fed during portions of the year, they become very important throughout the State during lean seasons or periods of drought. Further, in feeding animals for special purposes and on farms in or near cities, where practically no pasture is available, similar problems are experienced.

The following article is presented in the hope that it will assist those interested in feeding farm stock, to make a better selection of the many stock foods available for their particular purpose, and to obtain a proper perspective of the relative food values. A wide range of foodstuffs is dealt with, but the relative monetary values shown do not include freights and other handling charges from the merchant to the feeder. For this reason, the monetary value of home-grown fodders (grain, hay, silage, &c.) may be under-estimated.

As an example of the importance of having available information from which one may calculate the comparative values of stock foods, it may be pointed out that, a few months ago, when wheat was quoted at 3s. 10d. f.o.r. Williamstown, the grower would receive on the average approximately 3s. 1d. net per bushel—making 100 lb. wheat containing 8.3 lb. protein equivalent and 72.0 lb. starch equivalent, worth 5s. 2d. The same farmer buying bran for his stock would have had to pay the fixed price of £5 15s. per ton, plus approximately 15s. freight and other charges, making the total cost £6 10s. per ton on the farm. Thus 100 lb. bran containing 9.9 lb. protein equivalent, and 44 lb. starch equivalent, would cost him 6s. 6d. In this case wheat is 1s. 4d. per 100 lb. cheaper than bran, and, in addition, has a much higher food value, containing 64 per cent. more "pound starch equivalent" per 100 lb. than bran, although the protein equivalent is 16 per cent. less.

When the principles of feeding are being discussed, animals frequently are compared with locomotives. Just as the locomotive requires fuel for energy purposes, so does an animal require energy-producing foodstuffs—the fats and carbohydrates. The working parts of a locomotive must be repaired from time to time, and similarly, animals require a tissue-repairing food—the proteins. The minerals and vitamins in an animal's diet can be likened to the lubricating oils so necessary for the smooth running, efficiency, and long life of any machine.

The chemical analysis of a food gives a very poor guide to its food value. The chemist is able to determine the amount of dry matter, protein,

oil or fat, soluble carbohydrate, fibre, &c., in a food, but he is unable to determine what portion of these constituents is digestible and of use to the animal. The percentage of digestible nutrients in a food is determined by actual feeding experiments. The food is chemically analysed for protein, oil, soluble carbohydrate, and fibre, and is then fed to a test animal. The excreted dung is collected and chemically analysed, and by subtracting the two analyses the percentage of digestible nutrients is obtained.

Proteins contain 16 per cent. of nitrogen and smaller amounts of phosphorus and sulphur, in addition to carbon, hydrogen, and oxygen. Fats and carbohydrates are derived solely from the latter three elements. Proteins rich in phosphorus are found in large quantities in milk and eggs, while proteins rich in sulphur are most abundant in hair, wool, feathers, hooves, horns, and claws. Lean flesh and muscular tissue are composed almost solely of pure proteins.

The percentage of protein is usually expressed in analyses, as crude protein, and is arrived at by determining the percentage of nitrogen present in the sample and multiplying it by 6.25 (an arbitrary factor agreed upon by chemists as the result of numerous analyses). In many foodstuffs there is nitrogenous material present that is not pure protein. For instance, in roots, such as mangolds and turnips, as little as one-tenth of the digestible nitrogenous compounds is pure protein. In succulent pasturage (grasses and clovers) approximately two-thirds of the digestible nitrogenous compounds is pure protein, and this represents about one-half of the total crude protein content. The latest research workers in animal dietetics have found that the protein value of a food, expressed as the Protein Equivalent (P.E.), is, for all practical purposes, the mean between the percentages of digestible pure protein and of digestible crude protein. In latest tables and feeding charts the protein value of a food is shown in protein equivalents.

The amount of productive energy, that is, the amount of energy available for the production of fat, work, growth, or milk, which an animal is able to assimilate from a food was first determined about 30 years ago by Dr. Kellner in Germany. Kellner founded the Starch Equivalent (S.E.), the unit which expresses this productive energy value of a food, and which is determined by the increase in live weight resulting from the feeding of 1 lb. pure starch above a maintenance ration.

To arrive at the starch equivalent, test animals are fed certain fixed balanced rations that are maintaining them at certain fixed body weights. Quantities of starch are then added to their rations each day for a certain period, and the increases in body weights, resulting from this added starch, are determined. It has been found that to increase the weight of a store bullock by 1 lb., it takes approximately 4 lb. starch. These test animals are then reverted to their maintenance rations until their weights become steady when they are given another foodstuff, such as bran. To increase the body-weight by 1 lb., it takes approximately 9.1 lb. bran and the starch equivalent of bran works out at 44 lb. [9.1 : 4 as 100 : 44]. In other words 100 lb. bran has a productive energy value equal to 44 lb. starch. The starch equivalents of practically all foodstuffs have been determined, but it must be remembered that there is great variation in different samples.

The Gross Digestible Energy value of a food differs from the starch equivalent (which may be termed the Nett Digestible Energy value) in that it expresses the amount of heat that the food is able to produce in an animal's body, and not the productive energy such as the increase in live weight or the amount of animal fat stored up in the body. It is found that 1 lb. of a digestible fat or oil produces as much heat in the body as 2.3 lb. of starch or other digestible carbohydrate (sugars, fibre, &c.), that 1 lb. of pure protein produces as much heat as 1.25 lb. starch, and that digestible nitrogenous substances, not pure protein, as much heat per lb. as 0.6 lb. starch. The gross digestible energy value of oaten hay is determined as shown in Table I.

TABLE I.—DETERMINATION OF GROSS DIGESTIBLE ENERGY VALUE OF OATEN HAY.

	Digestible Nutrients.		Heat Factor.		Digestible Energy Value.
	%		%		%
Fat	1.8	×	2.3	=	4.1
Pure protein ..	3.3	×	1.25	=	4.2
Other nitrogenous substances ..	0.4	×	0.6	=	0.2
Soluble carbohydrate	31.9	×	1.0	=	31.9
Fibre	14.2	×	1.0	=	14.2
Gross Digestible Energy Value				=	54.6

The gross digestible energy value of 100 lb. oaten hay is equivalent to that of 54.6 lb. starch, but the productive energy value or starch equivalent is only 42 lb. For all practical purposes, the difference represents the cost of digestion, or the energy required for mastication and movement through the digestive tract, and for the secretion of the digestive juices. This energy cost of digestion is not altogether lost to the animal, because much of it is converted into heat and helps to maintain the warmth of the body in cold weather.

Foods with a low fibre content, such as animal products and grain, have a low cost of digestion, and the gross digestible energy values are not very much greater than the starch equivalents. On the other hand, fodders with a high fibre content, such as straw, have very high costs of digestion. Although the gross digestible energy value of 100 lb. of good quality oaten straw is equal to that of 41 lb. starch, the starch equivalent is only 21 lb. Similar figures for wheaten straw are 34 lb. and 13 lb. respectively.

Balanced Rations.

The Nutritive Ratio is the old form of expressing whether a particular food was balanced or not, according to the function it had to perform. It is the ratio between the percentage of digestible crude protein and the percentage of digestible carbohydrate, plus two and one-half times the percentage of digestible fat in a foodstuff, thus, to determine the Nutritive Ratio of a particular feed add the percentage of digestible carbohydrate to two and a half times the percentage of digestible fat and divide the sum by the percentage of digestible crude protein.

Narrow rations have nutritive ratios of 1 : 5 or less, that is, rations with a relatively high percentage of digestible crude protein. Wide rations are the reverse and have nutritive ratios of 1 : 9 or higher. A ration with a nutritive ratio of from 1 : 6 to 1 : 8 would be suitable for store, working, or fattening animals. Breeding animals and milking cows require rations with nutritive ratios of 1 : 5 or less.

A more convenient method of determining if a food is balanced is to divide the protein equivalent into the starch equivalent. A balanced ration for breeding animals and milking cows is one in which the starch equivalent is 5 times the protein equivalent. In balanced rations for store, working, or fattening stock, the starch equivalent is 6 to 10 times the protein equivalent.

Vitamins.

In Victoria, where most animals either have access to pasture and other green feed, or receive sufficient fresh fodder, deficiency of vitamins should never occur.

Cutting surplus pasture.

Minerals.

The topdressing of pastures and the wider use of licks, containing bone meal or di-calcic phosphate, have helped to eliminate mineral deficiency among the herds and flocks of Victoria. Young stock, breeding animals, and milking cows require more minerals than do working, fattening, or wool-producing animals.

Common salt (sodium chloride), which has a very stimulating effect on the appetite, should be the major constituent of all licks used for horses, sheep, and cattle. In licks for pigs too much salt may be injurious. Common salt can be utilized by an animal in its inorganic form, but animals are apparently unable to store salt in any quantity in their systems. In some districts sufficient salt is available in the water supply.

Calcium phosphate is the mineral used for bone making, and is therefore needed more by growing stock and breeding and milking animals. Undoubtedly the most economic method of supplying calcium phosphate to stock is through liberal top-dressing of pastures with superphosphate. The calcium phosphate in the pasturage is in a form that can be more readily assimilated by the animal than when supplied in bone meal or di-calcic phosphate licks. When fed on rations deficient in calcium phosphate, milking animals draw calcium phosphate from their bones to produce milk with a full supply of this mineral.

Iron is another essential mineral used by the blood for the conveyance of oyxgen to the muscular tissue. Iron deficiency is rare, but in deficient areas small quantities (up to 5 per cent.)

can be added to licks in the form of ferrous sulphate.

In certain areas, magnesium (added in the form of Epsom Salts) and iodine (added in the form of potassium iodide) are deficient. These minerals are usually in abundance in most districts of Victoria.

Suitable compound licks can be mixed in the following proportions :—

(*a*) *Suitable lick where top-dressing is practised—*

Common salt	80 per cent.
Bone meal	20 ,,

(*b*) *Suitable lick where top-dressing is not practised—*

Common salt	20 per cent.
Bone meal	80 ,,

(*c*) *Compound salt licks—*

Salt	61 lb.
Bone flour	30 lb.
Sulphur	5 lb.
Magnesium sulphate	3 lb.
Sulphate of iron (fine)	1 lb.
Potassium iodide	1 oz.
Manganese sulphate	1 oz.

and :—

Salt	71 lb.
Dicalcic phosphate	15 lb.
Sulphur	5 lb.
Molasses	5 lb.
Magnesium sulphate	3 lb.
Sulphate of iron (fine)	1 lb.
Potassium iodide	1 oz.
Manganese sulphate	1 oz.

Relative Food Values.

When estimating the relative food value of a fodder, the two main principles that a feeder has to take into consideration are its *starch equivalent* and its *protein equivalent.* Tables showing percentages of digestible fats, proteins, soluble carbohydrate, fibre, &c., are not altogether necessary, and they make calculations cumbersome.

For all cases of general feeding, the relative value of a fodder can be based almost solely on its starch equivalent, for example :—

(1) The feeding of working, fattening (except pigs), wool-producing, and store animals on ordinary mixed rations.

(2) The supplementary feeding of all animals grazed on green pasturage, green lucerne, young green oats, and other such green fodder crops.

(3) The feeding of store or fattening pigs and calves when ample skim milk is available.

In the absence of green pasturage or other green fodder and clover or lucerne hay, a protein rich supplementary feed is frequently necessary for balancing the ration. When assessing the value of fodders which have to be purchased under such conditions, the protein equivalent as well as the starch equivalent must be considered.

The capacity of all animals is limited. For instance, a 1,000-lb. cow can eat and digest up to 36 lb. ordinary dry feed daily. This represents up to 30-lb. dry matter, 6 lb. being moisture. When hand-feeding heavy milking cows, hard-working horses, and fattening animals that are being topped off, it becomes necessary to replace the coarse and bulky fodders in the ration with grain or other concentrate, otherwise the animals would have eaten their fill before they had consumed sufficient starch equivalents. Pigs, in particular, have small capacities, and, in addition, they are unable to digest foods with a high fibre content such as hay, chaff, or straw. They, therefore, require green or concentrated foods.

The "Ton" and the "Bushel."

The varying weights of the ton and bushel are misleading in the purchase of foodstuffs. Hay, chaff, greenstuffs, brewers' and distillers' grain are usually quoted by the ton (2,240 lb.), while nearly all by-products—bran, pollard, cakes and meals—are quoted by the short ton (2,000 lb.), but the short ton is seldom specified. The bushel weights of the more common grains and by-products sold by the bushel are shown in Table II.

Table II.—Bushel Weights.

Foodstuff.	Bushel Weight. lb.
Wheat	60
Peas	60
Rye	60
Maize	56
Barley	50
Oats	40
Sorghum	40
Bran	20
Pollard	20

Foodstuffs and Fodders.

Pasturage.

Pastures supply the bulk of stock foods in Victoria and their value is inestimable. Without pasture the beef, dairying, wool, mutton, and fat lamb industries would be unprofitable, and, therefore, in all general cases, hand-feeding must be considered as supplementary to pasturage. The importance of pasturage and its value as a stock food is dealt with briefly here. Several articles on the improvement and management of pastures have appeared in the Victorian Journal of Agriculture.

Pasturage is the cheapest of animal foodstuffs, and, when properly managed, supplies one of the most nutritious fodders.

Under irrigation, where the pastures are not affected by hot, dry weather, green succulent herbage should be available all the year round. Such herbage should have a nutritive ratio of 1 : 2.5, and in the winter months, when supplementary feeding is necessary to carry the full spring, summer, and autumn quotas of stock, practically any fodder can be utilized. In many parts of southern and eastern Victoria, pastures can be compared to those under irrigation for portion of the year. Supplementary feeding on such pastures is relatively simple, except perhaps in late summer when the grass has dried off, and, even with supplementary hay feeding, the dairy stock produce lower and lower milk yields. During this period high production can be maintained only by the feeding of a protein-rich supplementary feed.

Surplus pasture, in the flush of the season, can be harvested for hay or silage and conserved for later use. The nutritive value of pasture hay, and silage is governed by many factors, such as stage at which pasture is cut, kind of weather at harvesting, time allowed to cure, &c. Good quality pasture hay and silage have better feeding values respectively than oaten hay and silage, but these products, through deterioration, may decline to a stage when ultimately they become valueless as fodders.

Lucerne.

Lucerne is grown where pastures of mixed grasses and clovers are less suitable. Lucerne, which grows over a wide range of conditions, makes an excellent and palatable hay, three times as rich in digestible protein as oaten hay. It is a fodder suitable for milk producing and breeding animals.

Oats.

Oats sown early make excellent green feed for milking cows and lambing ewes during the autumn and winter. Oaten hay is the basis of most

Table III.—Showing Food Value of Pasture, Pasture Constituents, and Pasture Products.

	Digestible Nutrients.				Calculated from Digestible Nutrients.			
	Protein.	Fat.	Carbohydrate. Fibre.	Carbohydrate. Soluble.	Gross Digestible Energy.	Starch Equivalent.	Protein Equivalent.	Nutritive Ratio 1 : —
	%	%	%	%	per 100 lb.			1 :
Pasturage (mixed grass and clover) closely grazed	4·9	·7	2·6	6·8	17	14	4·5	2·3
Pasturage (mixed grass and clover) flowering	2·6	·5	4·6	8·9	17	14	2·2	5·6
Pasture constituents—								
Perennial ryegrass	1·8	·3	4·0	7·4	14	11	1·6	6·7
Cocksfoot	No figures available							
Prairie grass	2·7	·5	4·5	7·1	15	13	2·3	4·8
Alsike clover	2·1	·4	2·2	3·6	9	6	1·8	3·2
Red clover	2·5	·5	3·0	6·3	13	10	2·1	4·0
Strawberry clover / Subterranean clover	No figures available							
White Dutch clover	2·8	·5	2·6	4·7	11	9	2·4	3·0
Lucerne	3·2	·4	2·9	6·3	13	9	2·5	3·2
Pasture products—								
Mixed grass and clover silage	1.6	·4	3·8	4·9	11	8	1·2	6·0
Lucerne silage	2.5	·4	2·9	7·6	16	11	2·0	4·6
Mixed grass and clover hay	3·4	·7	15·0	27·5	48	36	2·9	13·0
Lucerne hay	11·1	·8	9·8	28·4	50	35	8·3	3·6
Red clover hay	8·5	1·7	11·3	26·0	48	38	7·0	4·9

Cutting grass for silage.

chaff. Good quality oaten hay or chaff has a food value (starch equivalent) equal to that of bran, although the protein content is less than half. It makes a suitable ration for store and low milk-producing animals, and stock will even fatten on it.

Oaten silage is simple to make and very palatable.

The oat grain is a highly concentrated food and well balanced for working horses, dairy cows, and breeding ewes. It can be fed in large quantities to all stock, and can be used to displace bran in the ration, 4½-lb. oats being equivalent to 6-lb. bran. Oats are best crushed or coarsely ground for cattle. The husks, on account of their high fibre content, render oat grain less suitable for pig food than other grain.

Oat bran (or branning), a by-product in the preparation of oatmeal, has a food value (starch

TABLE IV.—SHOWING DIGESTIBLE NUTRIENTS AND FOOD VALUE OF OATEN FODDERS. (Victorian figures).

	Digestible Nutrients.				Gross Digestible Energy.	Starch Equivalent.	Protein Equivalent.	Nutritive Ratio.
	Protein.	Fat.	Carbohydrate. Fibre.	Carbohydrate. Soluble.				
	%	%	%	%		per 100 lb.		1 :
Oats, green, grass stage	2·1	·4	1·9	6·1	11	9	2·0	4·3
Oats, green flowering	1·4	·4	4·9	6·5	14	10	1·1	8·9
Oaten hay	3·7	1·8	14·2	31·9	55	42	3·5	13·7
Oaten silage	1·2	·5	5·2	8·7	17	12	·9	12·6
Oaten straw	·7	·5	17·6	22·1	41	21	·6	58·4
Oat hulls or husks	·5	·1	19·0	22·5	42	21	·4	83·4
Oat grain	8·0	4·9	2·6	46·2	69	62	7·6	7·6
Oat bran or branning	4·8	2·8	5·7	39·9	57	49	4·6	11·0

equivalent) equal to that of bran, but the protein content is lower.

Average samples of oaten chaff and grain produced under Victorian conditions evidently have much lower protein contents than do similar samples produced in England and the United States of America. Since most original tables of analyses of foodstuffs published by this Department have been taken direct from oversea publications, higher protein contents have been shown.

Wheat.

Wheaten hay and shandy (wheaten and oaten) hay are widely used in the lower rainfall areas as fodder for farm horses. These hays are very palatable, are readily eaten, and make a complete ration for horses doing light work, store cattle, &c.

The grain is an excellent stock food, especially for fattening cattle and pigs. It should be coarsely ground and mixed well with chaff for horses and cattle. If finely ground and fed heavily, it becomes pasty in the mouth and unpalatable. The feeding of grain in preference to the wheat products—bran and pollard—is favoured during periods of low prices for wheat. Ground wheat can be used to displace pollard in any ration.

Bran is the most popular concentrate food used in Victoria. It is a perfectly balanced, safe, and appetizing food, and can be fed in any quantity to any animal at any time without causing disorder. On the other hand, due to excess carbohydrate, pollard, and crushed wheat and barley, if fed heavily, may cause food sickness in horses and cattle with loss of appetite. Bran is an excellent food for working horses, dairy cows, and breeding stock, including sows. Pollard and crushed wheat are more suitable for fattening animals, but can be fed with advantage to all classes of stock as a supplement to green pasturage.

Barley.

Barley makes a very palatable green fodder crop with a high food value. The crop can also be made into good silage, but, because of the awns, barley hay is not favored in this country.

The high food value and palatability of barley grain as a food for cattle, horses, and pigs are well known to farmers. Ground barley can be used to replace ground wheat or pollard in the ration.

Table V.—Showing Digestible Nutrients and Food Values of Wheat, Barley and their Products. (Victorian figures).

	Digestible Nutrients.				Gross Digestible Energy.	Starch Equivalent.	Protein Equivalent.	Nutritive Ratio.
	Protein.	Fat.	Carbohydrate. Fibre.	Carbohydrate. Soluble.				
	%	%	%	%	per 100 lb.			1 :
Wheat and Products.								
Wheat grain	9·4	1·3	1·0	65·7	79	72	8·3	7·4
Wheaten hay	3·2	1·3	7·2	32·4	47	31	3·0	13·4
Wheat, green, grass stage	No figures available							
Wheat, green, flowering	No figures available							
Wheaten silage	1·4	·5	6·3	8·9	17	12	1·0	11·7
Wheaten straw	·2	·4	14·6	17·8	34	13	·1	66·8
Bran	10·9	2·1	1·3	42·0	61	44	9·9	4·5
Pollard	11·1	3·5	1·4	51·9	75	69	10·6	5·6
Barley and Products.								
Barley grain	7·2	1·2	1·5	65·1	76	71	6·8	9·7
Barley, green, grass stage	1·9	·3	2·2	7·2	12	9	1·8	5·3
Barley, green, flowering	1·8	·4	5·1	5·8	14	11	1·6	6·6
Barley silage	No figures available							
Barley straw	·8	·5	19·8	22·5	44	23	·7	54·4
Brewers' or distillers' grains (wet)	3·7	1·3	1·4	8·6	17	13	3·6	3·6
Brewers' or distillers' grains (dry)	13·1	3·5	7·2	28.5	60	46	12·6	3·4
Malt coombs (dry)	20·0	1·7	12·9	32·6	69	45	16·0	2·5
Barley bran	9·8	3·4	3·3	44·6	67	61	9·5	5·8
Malt, dry	11·0	2·4	4·5	56·4	79	72	9·9	6·1

TABLE VI.—SHOWING DIGESTIBLE NUTRIENTS AND FOOD VALUES OF MAIZE AND ITS PRODUCTS.

	Digestible Nutrients.				Gross Digestible Energy.	Starch Equivalent.	Protein Equivalent.	Nutritive Ratio.
	Protein.	Fat.	Carbohydrate. Fibre.	Carbohydrate. Soluble.				
	%	%	%	%	per 100 lb.			1 :
Maize, green, flowering	1·0	·3	3·1	5·8	10	8	·8	9·7
Maize silage	·9	·4	3·2	7·5	12	9	·7	13·0
Maize grain	7·6	2·5	·8	64·5	79	77	7·4	9·4
Maize oil meal	17·2	12·9	5·6	39·5	94	88	17·0	4·5
Maize gluten feed (polly feed)	21·4	3·6	5·6	45·6	84	78	20·5	2·8

By-products coming from barley are brewers' and distillers' grains, malt coombs, and barley bran. Wet brewers' and distillers' grains are used almost solely for the feeding of dairy stock round the metropolitan areas. Their food value (starch equivalent) and protein equivalent are as high as those of good pasture. The moisture content of wet grains is variable and influences their food value. Dried brewers' or distillers' grains are a well-balanced concentrate, and can be used to displace oats and bran, wholly or in part, in the ration for breeding, working, or dairy stock. Malt coombs (by-product of malt factories) contain a higher percentage of digestible protein. They can be fed in the same manner as grains. Barley bran (by-product from manufacture of pearl barley) is intermediate in food value between barley grain and dried brewers' grains.

MAIZE.

Because of the high yields per acre, maize is grown extensively as green fodder and as a crop for silage. The food value varies between that of barley and that of oats, but the protein content is low in comparison. Therefore, for best results with green maize or maize silage, supplementary feeds should be restricted to oaten or lucerne hay, bran, oats, or brewers' grains. Green maize is a late summer, early autumn crop, whereas oats and barley produce green feed in late autumn and winter.

Maize grain is widely used as a fattening food for pigs in conjunction with skim milk, and the combination is ideal. Too large a percentage of maize in the ration for pigs is said to produce "oily" bacon. Ground maize can be fed to working horses or fattening stock, but it is not economical or altogether suitable for feeding to breeding or milking animals.

Maize oil meal and polly feed (gluten feed) are by-products from the manufacture of maize starch. Both these products are suitable for breeding and dairy stock, and can be used to displace oats, bran, or brewers' grains in the ration. They have a higher food value and contain more digestible protein than bran. Maize oil meal is a better food than bran, 1 lb. of the former being about equal to 2 lb. of the latter.

LINSEED MEAL.

The high protein content and digestibility of linseed meal make it one of the best by-product fodders. Its food value (starch equivalent) is also higher than that of most grains. Although linseed meal is not regarded as a general food, largely on account of its relatively high cost, it is widely fed in the rations of all high producing dairy cows and stock fed for show purposes. On dairy farms supplying milk to Melbourne, it is difficult to maintain milk yields in the winter months without additions of linseed meal to the rations of the cows. Stock fed with small quantities of linseed meal usually appear more thrifty and have a conspicuously glossy coat, and cows produce a richer milk.

Linseed meal is obtained also in the form of "Sheep Nuts". Again the high protein content is utilized to balance the ration for sheep on drought stricken pastures, where the only other fodder available is dry, fibrous, protein-deficient herbage.

Linseed meal, made in the form of a gruel, is a good substitute for butter-fat when skim milk is fed to calves.

COTTON SEED MEAL (DECORTICATED).

Cotton seed meal is a similar foodstuff to linseed meal. It can be fed wholly or in part to replace linseed meal in the ration for dairy cows. Good samples contain considerably more digestible protein than do good samples of linseed meal. The

Dairy farmers carting beet pulp from the Maffra factory.

food value of some brands of cotton seed meal, however, varies considerably.

Root Crops.

Root crops are not extensively grown as stock foods. Generally, they have low food values, but this is offset partly by the heavy yields per acre and partly by the fact that they have many of the properties of green fodders and stimulate the appetite for dry food.

Potatoes make a good food for pigs. Mangolds and turnips can be grown as winter food for cattle, sheep, and pigs.

Sugar beet is grown in the Maffra district only. The beets make good food for pigs, while the tops are a good fodder for sheep and cattle in the autumn months. Sugar beet pulp (the sliced beets after most of the sugar has been extracted) form a satisfactory and cheap food for dairy cattle in autumn and winter. While the beet factory is working, fresh pulp is sold; but, after the season is finished, ensiled pulp is available, and this has a higher food value on account of the lower moisture content. Beet pulp is an extremely cheap fodder in the Maffra district.

Molasses.

Molasses is a by-product from the manufacture of sugar, and is purely a fattening food. For general feeding, molasses should never comprise more than about 15 per cent. of the ration. The bulk of the food material in molasses is carbohydrate (uncrystallized sugar), and can be used for fat production and energy purposes only. Stock acquire a liking for molasses, which can be dissolved in hot water, and as such is widely used for sprinkling over and damping down food for milking cows. Fodder treated in this manner is relished by stock.

Blood Meal and Meat Meal.

The principal constituent of blood meal and meat meal is protein, and, therefore, they can be added to the rations of all stock to balance deficiencies in protein. At present only a small quantity of these meals is fed outside poultry pens, but up to 15 per cent. can be added to the rations of dairy cows and pigs with beneficial results. Meat meal, as sold on Victorian markets, is not all true meat meal, but mostly carcass meal, composed of meat and bone and varies in protein and mineral content. Some samples, which could almost be called bone meal, contain as little as 30 per cent. crude protein and over 40 per cent. ash, while other samples resembling true meat meal contain nearly 80 per cent. crude protein and only a small percentage of ash. Meat meal is the cheapest protein food available, but it should be standardized.

It is certain during the winter months that the feeding of meat meal in order to narrow and balance rations of chaff and crushed grain for milking cows and to replace skim milk in rations for pigs will be increased as the value of meat meal as a protein supplementary food becomes more widely known.

Meat meal contains up to 12 per cent. digestible fat, and in this respect it differs from blood meal, which contains practically none.

Milk and Its Products.

Milk is nature's food for the young, and in this respect it is a perfect ration. Whole milk is too valuable to consider as a stock food, but separated milk, butter milk, and whey are as economically fed to stock as turned into other products. When dried, these products have the added value of being less bulky as well as being non-perishable. Unfortunately, the cost of drying these materials is as great as their value as a stock food.

Skim milk and first butter milk are excellent for pigs and calves to balance a grain and hay ration. Whey makes a good pig food, and older calves do well on it, but its protein content is low, and it will not balance a wide ration. Skim milk and whey must be fresh for calf feeding, but pigs do better when the products are soured.

Relative Value of Concentrates.

The accompanying table has been compiled to show the order of merit of common concentrates, according to their food values—starch equivalents. The market value of such concentrates could be based fairly accurately on the starch equivalents; thus, if bran were worth 88s. per ton, cotton seed meal would be worth 140s., maize oil meal 176s., &c.; but when making such monetary values, favorable allowances must be made for the fodders with the higher protein equivalents.

Table VII.—Order of Merit of Concentrates according to Starch Equivalents.

Concentrate.	Starch Equivalent.	Protein Equivalent.
Linseed (seed)	117	14·3
Whey, Dried (one sample only)	90	30·3
Pea-Nut Meal	89	36·0
Maize Oil Meal	88	17·0
Dried Butter Milk	85	30·4
Meat Meal	84	54·5
Dried Separated Milk	79	28·5
Maize Gluten Feed	78	20·5
Maize (grain)	77	7·4
Wheat (grain)	72	8·3
Linseed Meal	72	22·2
Barley (grain)	71	6·8
Malt	71	9·9
Rice Meal	71	6·5
Cotton Seed Meal	70	33·0
Peas (seed)	69	18·2
Pollard	69	10·6
Sorghum (grain)	68	6·4
Blood Meal	66	65·0
Sugar Beet Pulp (dry)	64	4·4
Oats (grain)	62	7·6
Barley Bran	61	9·5
Linseed Meal (extracted)	61	22·2
Oat Bran	49	4·6
Sugar Cane Molasses	49	1·2
Brewers' Grains (dry)	46	12·6
Malt Coombs	45	16·0
Bran	44	9·9

Protein-Rich Fodders.

The protein equivalents of foodstuffs (concentrates) at present on the market are shown in Table VIII. Skim milk, wet brewers' grains, green pasturage, and most other green fodders could be added to this list as protein-rich fodders, but, due to their bulk, these commodities, containing up to 85 per cent. moisture, are economical to feed only near the sources of supply.

Table VIII.—The Protein-Rich Concentrates (in order of merit).

Concentrate.	Protein Equivalent.	Nutritive Ratio.	Starch Equivalent.
Blood Meal	65·0	..	92
Meat Meal	54·5	..	102
Pea-Nut Meal	36·0	1 : 1·8	89
Cotton Seed Meal	33·0	1 : 1·3	70
Dried Butter Milk	30·4	1 : 2	85
Dried Separated Milk	28·5	1 : 2	79
Linseed Meal	22·2	1 : 2·4	72
Linseed Meal, extracted	22·2	1 : 2·0	61
Vetches (grain)	21·5	1 : 2·3	70
Maize Gluten Feed	20·5	1 : 2·8	78
Peas (grain)	18·2	1 : 2·8	69
Maize Oil Meal	17·0	1 : 4·5	88
Malt Coombs	16·0	1 : 2·5	45
Linseed (seed)	14·3	1 : 7·3	117
Whey, Dried (one sample only)	13·3	1 : 5·7	90
Brewers' Grains (dry)	12·5	1 : 3·4	46
Pollard	10·6	1 : 5·6	69
Bran	9·9	1 : 4·5	44

Rations for Stock.

When prescribing rations for stock the feeder has to use his discretion and adjust them in accordance with the amount and nature of the pasturage available, the season, condition of the stock, purpose for which stock are fed, nature of the available foods, and the market value of foods to be bought.

Most hand-feeding is supplementary to pasturage. When the pastures are green and succulent, and supply a large proportion of the animal's requirements, supplementary hand-feeding can be restricted to those foods with a wide nutritive ratio (1 : 8) such as hays and grain. When the pastures are dry or drying off, narrower supplementary rations become necessary, especially for dairy cows and breeding animals. Such foods as lucerne hay, and silage, brewers' grains, oats, bran, pea meal, linseed meal and

cotton seed meal balance a dry pasture ration. Small additions of meat meal to a ration of hay and grain would make a good supplementary feed to dry pasture.

Nearly all feeding standards have evolved from feeding tests in which the experimental animals have been housed. These test animals are not exposed to the variable and frequently very unfavorable weather conditions, and they have no laborious exercise in walking to and from milking sheds or grazing for hours over a sparse pasture for sufficient food to satisfy their hunger. The requirements of laboratory animals, especially horses and cattle, will therefore be less than for stock grazed out under natural conditions.

Cattle.

Daily rations for milking-cows *wholly* hand-fed should consist of as much roughage (hay, chaff, or silage) as the cows will eat, and concentrates in proportion to the milk yields, as follows :—

Friesian Cows—3-lb. concentrate per gallon of milk.

Red Poll, Ayrshire and Shorthorn cows—3½-lb. concentrate per gallon of milk.

Jersey and Guernsey cows—4-lb. concentrate per gallon of milk.

The requirements of the different breeds of cows when housed are shown clearly in Table IX.

TABLE IX.—FEEDING TABLE FOR DIFFERENT BREEDS OF CATTLE (TOTAL REQUIREMENTS WHEN HOUSED).

	Jerseys and Guernseys. 800-lb. live weight. 5·0 % milk.		Ayrshires and Red Polls. 1,000-lb. live weight. 4·5 % milk.		Shorthorns. 1,200-lb. live weight. 4·0 % milk.		Friesians. 1,200-lb. live weight. 3·6 % milk.	
	Roughage (Hay).	Concentrate.	Roughage.	Concentrate.	Roughage.	Concentrate.	Roughage.	Concentrate.
	lb.	lb.	lb.	lb.	lb.	lb.	lb.	lb.
Maintenance	15	..	18	..	21	..	21	..
,, + 1 gal. milk ..	23	..	25	..	28	..	28	..
,, + 2 ,, ,, ..	17	7	25	3½	28	3½	28	3
,, + 3 ,, ,, ..	13	12	19	10½	21	10½	25	9
,, + 4 ,, ,, ..	9	16	15	14	18	14	22	12
,, + 5 ,, ,, ..	6	20	12	17½	15	17½	19	15
,, + 6 ,, ,, ..	3	24	9	21	12	21	16	18
,, + 7 ,, ,, ..	..	..	6	24½	9	24½	13	21
,, + 8 ,, ,, ..	..	..	3	28	6	28	10	24
,, + 9 ,, ,, ..	..	..	..	..	3	31½	7	27

Feeding concentrates in the cow shed, Werribee Research Farm.

Adequate fodder reserves—the best insurance against drought.

The appetite or amount of food that a cow can eat is limited. For this reason, the amount of roughage fed must be decreased for higher milking cows to enable them to eat the requisite amount of concentrates. For instance, an ordinary 800 lb. dry Jersey cow can eat and digest up to 22 lb. ordinary dry food. The production of milk increases the appetite, and a milking Jersey cow, of similar weight, can eat up to 27 or 28 lb. of ordinary dry food. The appetite is stimulated also by exercise and weather conditions.

To obtain a balanced ration for milking cows the roughages and concentrates should be so mixed that the starch equivalent is not more than five times the protein equivalent.

Hay and silage are the most common supplementary winter foods, and are adequate for cows producing round 1½ gallons milk daily. Heavy milking cows will either drop in their milk yields or lose condition if fed entirely with roughage as a supplement to winter pasturage.

The food requirements of cattle in terms of starch and protein equivalents, and determined by actual feeding experiments in Europe, are set out in Table X. The results shown in this table are applicable only to housed stock that receive sufficient exercise for good health, a practice, while common in European countries, is rarely experienced here.

TABLE X.—TOTAL FOOD REQUIREMENTS OF CATTLE IN TERMS OF PROTEIN AND STARCH EQUIVALENTS. (HOUSED STOCK).

Maintenance Requirements.

Live Weight of Animal.	Dry Matter.	Starch Equivalent.	Protein Equivalent.
lb.	lb.	lb.	lb.
200	10	2.7	.27
400	13	3.5	.35
600	16	4.3	.43
700	17½	4.7	.47
800	19	5.1	.51
900	20½	5.5	.55
1,000	22	6.0	.60
1,100	23½	6.5	.65
1,200	25	6.9	.69
1,300	26½	7.3	.73
1,400	28	7.7	.77
1,500	29½	8.2	.82

Requirements for Each Gallon of Milk Produced.

Butter-fat.	Starch Equivalent.	Protein Equivalent.
%	lb.	lb.
3.0	2.1	.51
3.5	2.4	.58
4.0	2.7	.64
4.5	3.0	.71
5.0	3.2	.78
5.5	3.5	.85
6.0	3.7	.92

Requirements for Increases in Live Weight.

Age of Animal.	Condition of Animal.	Starch Equivalent Required per lb. Increase in Live Weight.
		lb.
Under 2 years ..	Store	2
„ „ ..	Forward	2.25
2 years	Store	2.25
„ ..	Forward	2.5
Over 2 years ..	Store	2.5
„ „ ..	Forward	2.75
„ „ ..	Half fat	3
„ „ ..	Fat	4

The nutritive ratios of rations for store cattle should be from 1 : 8 to 1 : 10, and for growing or fattening cattle from 1 : 6 to 1 : 8.

Horses.

Generally, horses are suitably fed on basal rations of good quality chaff with added quantities of oats or other concentrate, according to the amount of work that they are doing, and small quantities of greenstuff. On a farm varying

Watering Horses.

proportions of the horses' requirements may be obtained directly by grazing.

Horses require rations with nutritive ratios of approximately 1 : 8. Since the nutritive ratios of fodders usually fed to horses are round this figure, the rations will be balanced. Oats, as a grain supplement for horses, are deservedly popular. When oats have to be displaced by other forms of grain or concentrate, it must not be done on a

TABLE XI.—FEEDING CHARTS FOR HORSES.

Requirement of Starch and Protein Equivalents.

Nature of Work being done.	Light Horse (1,000 lb. Live Weight).		Medium Horse (1,200 lb. Live Weight).		Heavy Horse (1,400 lb. Live Weight).	
	Starch Equivalent.	Protein Equivalent.	Starch Equivalent.	Protein Equivalent.	Starch Equivalent.	Protein Equivalent.
	lb.	lb.	lb.	lb.	lb.	lb.
Maintenance (idle)	7·2	0·8	8·2	0·9	9·2	0·9
Light work	9·2	1·0	10·5	1·2	11·8	1·3
Medium work	11·6	1·4	13·2	1·6	14·8	1·8
Heavy work	14·0	1·9	15·9	2·1	17·8	2·3

Suitable Rations of Oaten Chaff and Oat Grain.

Nature of Work being done.	Light Horse (1,000 lb. Live Weight).		Medium Horse (1,200 lb. Live Weight).		Heavy Horse (1,400 lb. Live Weight).	
	Starch Equivalent.	Protein Equivalent.	Starch Equivalent.	Protein Equivalent.	Starch Equivalent.	Protein Equivalent.
	lb.	lb.	lb.	lb.	lb	lb.
Maintenance (idle)	17	..	20	..	22	..
Light work	22	..	25	..	24	3
Medium work	20	5	22	6	24	8
Heavy work	18	10	20	12	22	14

pound for pound basis, but in the following proportions. The figures shown are the equivalent of 10 lb. of oats :—

	lb.
Bran	14·1
Barley (grain)	8·7
Brewers' grains (dry)	13·4
Maize oil meal	7·0
Linseed meal	8·6
Pollard	9·0
Maize (grain)	8·0

Greenstuff can be used to displace part of the chaff in the ration, by using 4 lb. greenstuff in place of 1 lb. chaff. Small quantities of feed should be given regularly at frequent intervals. The horse should be given at least four feeds daily, and larger portions of the grain ration should be given at feeds when the horse has least time to eat.

Horses should always be offered water before meals. The water, then, has an uninterrupted passage to the caecum, where it is stored. Watering after feeding is the cause of most cases of colic and other digestive disorders, due to undigested food being washed from the stomach into the intestines. It is customary to rest horses on one day each week and either turn them out to pasture or give them a laxative ration of greenstuff or bran.

The requirements of different sized horses doing different amounts of work are set out in Table XI. It is impossible to define just what light, medium and heavy work is, and much has to be left to the feeder to increase or decrease the oat ration according to whether the horse is losing or gaining condition. Most farm work would fall into the light and medium classes.

Sheep.

Each year in Victoria more and more sheep are receiving supplementary hand-feed during the months when pasturage is scarce. On larger sheep farms very little home grown fodder is conserved, and the principal supplementary hand-feeds are oats and linseed meal nuts. These concentrates are preferred to roughages, because not only are they readily eaten by the sheep without waste, when, as is usual, they are spread on the ground, but also the freight and cartage costs are less, and a minimum amount of labour is involved in feeding them out.

Top-dressing, rotational grazing, better utilization of the pasturage in the flush season, and irrigation, are some of the more modern practices employed to increase the carrying capacity of farms. Cases are on record where the carrying capacity has been increased twelve times what it was prior to the introduction of improved methods. Under these conditions, supplementary hand-feeding in lean seasons becomes essential.

It is customary for ewes to lamb during the winter which, south of the divide, usually is the leanest period of the year. Fewer losses of ewes and lambs, quicker maturing lambs, heavier fleeces from the ewes, and better conditioned ewes are a few of the advantages due to supplementary hand feeding.

The total food requirements of sheep vary considerably, and it is still controversial as to what a sheep really requires, since research workers continually get very divergent results. The

Well-fed farm horses at pasture.

English authorities allow a dry ewe or wether (100 lb. live weight) 9 lb. starch equivalent per week. This is equivalent to approximately 10 lb. succulent green grass, 3 lb. oaten chaff, 2 lb. oats, or $1\frac{2}{3}$ lb. linseed meal nuts per day. A local investigator (Thomas) was able to maintain wethers (80 to 85 lb. live weight) on as little as 3 oz. linseed meal nuts, plus $1\frac{1}{2}$ lb. oaten straw per wether per day. Nevertheless, it is seldom necessary to feed more than a small portion of the full ration, as pickings are usually available. The amount fed can be left to the discretion of the owner by closely observing the condition of the flock.

The conservation of surplus grass in the form of hay or silage and the growth of early winter crops of oats or barley for grazing off are economical means of supplementary feeding.

Pigs.

Like horses, pigs usually are fed more liberally, since very little experience is required to learn that an underfed pig is not only unsightly and a subject for local comment, but also results in financial loss. In Victoria pigs are usually run in conjunction with dairying to utilize skim milk. Many pigs are reared solely on a skim milk diet. This practice may not be ideal, but it is simple and involves no outlay in purchasing fodders. Skim milk is best when allowed to sour before feeding. A pig twelve weeks old can eat approximately $2\frac{1}{2}$ gallons skim milk daily.

The value of skim milk as a pig food is explained concisely by Barratt and Mercer in the *Pig Breeders Annual* 1935–36, thus :—

> "In whole milk, separated milk, and possibly in whey there are factors whose presence may prevent disease, produce appetite and aid digestion.
>
> "When fed at the rate of as little as $\frac{1}{2}$ pint per head per day, whole and separated milks have given responses equal to cash values of about 7d. and 5d. per gallon respectively. Additional quantities such as $\frac{1}{2}$ gallon per head per day may give responses in accordance only with their chemical composition, and thus depress the value per gallon to something like $2\frac{1}{2}$d. and $1\frac{1}{2}$d. respectively.
>
> "Excessive whey consumption at more than 2 gallons per head per day appears to have a detrimental influence on belly thickness in a baconer. There is definite evidence that milk and separated milk give rise to lean carcasses, though we have as yet no evidence to enable us to correlate milk feeding with high grading."

It is the protein only in the food that can produce lean flesh, and, for this reason, narrower rations produce the leaner pork and bacon which the present markets demand.

The food requirements of pigs are set out in Table XII.

TABLE XII.—THE FOOD REQUIREMENT OF PIGS.

Age in Weeks.	Approximate Live Weights.	Food Allowance per Head per Day.	Approximate Nutritive Ratio.
	lb.	lb.	
3 to 8 ..	10 to 25	$\frac{1}{2}$ to $1\frac{1}{2}$	1 : 4
8 ,, 12 ..	25 ,, 50	$1\frac{1}{2}$,, $2\frac{1}{2}$	1 : 5
12 ,, 16 ..	50 ,, 80	$2\frac{1}{2}$,, $4\frac{1}{2}$	1 : 5
16 ,, 20 ..	80 ,, 115	$4\frac{1}{2}$,, $5\frac{1}{2}$	1 : 6
20 ,, 24 ..	115 ,, 155	$5\frac{1}{2}$,, 7	1 : 7
24 ,, 30 ..	155 ,, 220	7 ,, 9	1 : 8
Sows in pig ..	..	2 ,, 6	1 : 5
Suckling Sows	..	8 ,, 14	1 : 5
Stock Boars ..	..	3 ,, 7	1 : 5

There is slightly less than 1 lb. of dry matter in 1 gallon of skim milk. Some feeders prefer sloppy rations, while in many large piggeries dry feed is fed in hoppers, and water is laid on in troughs. A sloppy ration usually contains at least three parts of water to one of food, and frequently when they are fed in this manner the pigs receive no other water. Pigs have been found to do best when they are fed a 50–50 ration (50 per cent. water and 50 per cent. food), and when they have access to ample fresh drinking water.

The grazing of store and growing pigs, sows, and boars on good pasture is becoming a more general practice, and is to be recommended as an economical method of feeding them. When grazed porkers and baconers require supplementary grain feeding. Waste fruit and vegetables, household and restaurant scraps, tankage, &c., can also be fed profitably to pigs.

When concentrates have to be purchased pollard, barley and maize are most favoured.

Feed Taints.

At times certain fodders, principally green fodders and silage, are known to cause taints and otherwise affect animal products. Milk is most susceptible to taints. At certain stages of their growth, many green fodders, such as lucerne clovers, rape, and cabbages, as well as silage and wet brewers' grains, taint milk. Many weeds, onions, and numerous aromatic plants also cause similar troubles.

Taints in mutton and lamb are noticed when sheep and lambs are slaughtered directly after grazing on lucerne, rape, or pastures highly infected with weeds such as hoary cress, mustard, &c.

Pork becomes tainted when the pigs, before slaughter, have been fed such materials as fish tankage. Maize and fish products are also held responsible for producing oily bacon, but this defect can usually be overcome by correctly balancing the ration and adding variety to it.

Feed taints in milk are usually at their worst for the first six hours after the consumption of the responsible foods. After twelve hours the taints are slightly evident, but after eighteen hours they appear to have completely gone. Taints in meat can be overcome by changing the diet to foods that will not taint, approximately one week before the animals are killed.

Analyses and Nutritive Value of Fodders.

Mr. W. R. Jewell, M.Sc., Agricultural Research Chemist of the Department, has made available for this article the average composition of the more common fodders. These analysis are of Victorian samples, and are tabulated at the conclusion of this article.

The digestible nutrients have been calculated from the chemical analyses in the same proportions as shown by Prof. Wood and Dr. Woodman, in "Rations for Livestock," Bulletin No. 48, published by the British Ministry for Agriculture and Fisheries.

CHEMICAL ANALYSES OF VARIOUS FOODSTUFFS.

	Average Composition.							Digestible Nutrients (Calculated from Chemical Analysis).				Food Values (Calculated from Digestible Nutrients).			
						Crude Carbohydrate.				Carbohydrate.					
	Moisture.	Dry Matter.	Ash.	Crude Protein.	Crude Fat.	Fibre.	Soluble.	Protein.	Fat.	Fibre.	Soluble.	Gross Digestible Energy.	Starch Equivalent.	Protein Equivalent.	Nutritive Ratio.
	%	%	%	%	%	%	%	%	%	%	%	Per 100 lb.	Per 100 lb.	Per 100 lb.	1 :
Green Fodders.															
Pasturage (mixed grasses and clovers, succulent and closely grazed) ..	80·0	20·0	2·3	5·6	1·1	3·2	7·8	4·9	0·7	2·6	6·8	17	14	4·5	2·3
Pasturage (mixed grasses and clovers, flowering) ..	75·0	25·0	2·1	3·7	0·9	7·1	11·2	2·6	0·5	4·6	8·9	17	14	2·2	5·6
Cocksfoot grass	No figures available.														
Perennial rye grass ..	75·2	24·8	2·6	2·9	0·7	7·1	11·5	1·8	0·3	4·0	7·4	14	11	1·6	6·7
Prairie grass	76·8	23·2	2·5	4·1	0·8	6·7	8·9	2·7	0·5	4·5	7·1	15	13	2·3	4·8
Alsike clover	85·0	15·0	1·5	3·3	0·6	4·5	5·1	2·1	0·4	2·2	3·6	9	6	1·8	3·2
Red clover	81·0	19·0	1·6	3·4	0·7	5·2	8·1	2·5	0·5	3·0	6·3	13	10	2·1	4·0
Strawberry clover ..	No figures available.														
Subterranean clover ..															
White Dutch clover ..	81·5	18·5	2·1	4·4	0·8	4·3	6·9	2·8	0·5	2·6	4·7	11	9	2·4	3·0
Lucerne, in flower ..	76·0	24·0	2·3	4·5	0·8	6·8	9·6	3·2	0·4	2·9	6·3	13	9	2·5	3·2
Oats, feeding-off stage ..	82·0	18·0	2·0	2·9	0·5	3·2	9·4	2·1	0·4	1·9	6·1	11	9	2·0	4·3
Oats, in flower	76·8	23·2	1·8	1·9	0·6	8·5	10·4	1·4	0·4	4·9	6·5	14	10	1·1	8·9
Barley, feeding-off stage ..	81·0	19·0	2·2	2·4	0·5	4·0	9·9	1·9	0·3	2·2	7·2	12	9	1·8	5·3
Barley, in flower ..	79·0	21·0	1·8	2·7	0·6	7·9	8·0	1·8	0·4	5·1	5·8	14	11	1·6	6·6
Wheat, feeding-off stage ..	No figures available.														
Wheat, in flower ..															
Maize	82·0	18·0	1·2	1·7	0·5	5·6	9·0	1·0	0·3	3·1	5·8	10	8	0·8	9·7
Sorghum	80·0	20·0	1·4	2·1	0·6	6·2	9·7	1·2	0·2	3·3	5·8	11	8	1·0	7·8
Sugar beet tops	83·8	16·2	3·4	2·0	0·5	1·6	8·7	1·4	0·3	1·1	7·2	10	9	1·2	6·5
Rye, in flower	77·0	23·0	1·7	3·0	0·9	7·5	10·3	2·1	0·5	4·9	7·0	15	11	1·8	6·2
Cabbage	89·0	11·0	1·2	1·5	0·4	2·0	5·9	1·1	0·2	1·4	4·6	8	7	0·9	5·9
Rape	86·0	14·0	2·1	3·5	0·7	3·5	4·2	2·5	0·4	1·9	2·9	8	6	2·0	2·3
Peas, feeding-off stage ..	80·0	20·0	1·8	3·8	0·4	3·7	10·3	2·6	0·2	1·9	6·8	12	9	2·2	3·5
Root Crops.															
Carrots	83·0	17·0	2·3	1·0	0·2	1·6	11·9	0·7	0·1	1·2	11·4	13	11	0·6	19·7
Mangolds	85·0	15·0	1·4	1·2	0·1	2·3	10·0	0·7	..	0·9	9·2	10	6	0·4	14·3
Potatoes	75·5	24·5	1·1	2·1	0·1	0·9	20·4	1·1	..	0·8	18·4	19	18	0·8	17·5
Sugar Beet	77·0	23·0	2·0	1·3	0·1	1·8	17·8	0·9	..	0·6	16·8	18	13	0·5	19·1
Swede Turnips	86·0	14·0	1·2	1·0	0·1	1·6	10·1	0·8	..	1·1	9·4	10	8	0·5	13·1

Chemical Analyses of Various Foodstuffs.—*continued.*

	Average Composition.							Digestible Nutrients (Calculated from Chemical Analysis).				Food Values (Calculated from Digestible Nutrients).			
						Crude Carbohydrate.				Carbohydrate.					
	Moisture.	Dry Matter.	Ash.	Crude Protein.	Crude Fat.	Fibre.	Soluble.	Protein.	Fat.	Fibre.	Soluble.	Gross Digestible Energy.	Starch Equivalent.	Protein Equivalent.	Nutritive Ratio.
	%	%	%	%	%	%	%	%	%	%	%	Per 100 lb.	Per 100 lb.	Per 100 lb.	1:
Hay.															
Mixed grass and clover	14·5	85·5	7·1	6·1	1·8	26·4	44·1	3·4	0·7	15·0	27·5	48	36	2·9	13·0
Clover (red)	16·5	83·5	6·0	13·5	2·9	24·0	37·1	8·5	1·7	11·3	26·0	48	38	7·0	4·9
Lucerne	10·0	90·0	8·1	14·9	1·8	23·4	41·8	11·1	0·8	9·8	28·4	50	35	8·3	3·6
Oaten	12·6	87·4	5·8	4·9	2·5	23·5	50·7	3·7	1·8	14·2	31·9	55	42	3·5	13·7
Wheaten	13·3	86·7	5·6	5·8	2·0	22·1	51·2	3·2	1·3	7·2	32·4	47	31	3·0	13·4
Silage.															
Mixed grass and clover	80·0	20·0	2·0	2·3	0·8	6·5	8·4	1·6	0·4	3·8	4·9	11	8	1·2	6·0
Maize	75·0	25·0	1·8	1·9	0·8	5·8	14·7	0·9	0·4	3·2	7·5	12	9	0·7	13·0
Oats	71·0	29·0	1·8	2·0	1·1	8·7	15·4	1·2	0·5	5·2	8·7	17	12	0·9	12·6
Lucerne	75·0	25·0	2·7	3·7	0·8	6·9	10·9	2·5	0·4	2·9	7·6	16	11	2·0	4·6
Wheat	70·0	30·0	3·0	2·4	0·9	9·7	14·0	1·4	0·5	6·3	8·9	17	12	1·0	11·7
Barley	No figures available.														
Straw.															
Barley	10·0	90·0	5·9	3·5	1·5	36·7	42·4	0·8	0·5	19·8	22·5	44	23	0·7	54·4
Oats	11·0	89·0	6·1	2·2	1·6	31·0	48·1	0·7	0·5	17·6	22·1	41	21	0·6	58·4
Rice husks	10·0	90·0	14·1	3·8	1·4	38·0	32·7	0·4	0·9	0·4	11·5	14	3	0·3	38·0
Wheat	11·0	89·0	6·3	4·1	1·4	29·1	48·1	0·2	0·4	14·6	17·8	34	13	0·1	66·8
Seeds and Grains.															
Barley	13·0	87·0	2·6	9·6	1·5	2·7	70·6	7·2	1·2	1·5	65·1	76	71	6·8	9·7
Maize	12·5	87·5	1·3	9·5	4·0	2·3	70·4	7·6	2·5	0·8	64·5	79	77	7·4	9·4
Millet (Japanese)	11·5	88·5	3·7	12·6	4·8	8·6	60·8	9·5	3·8	2·9	45·6	69	62	9·1	6·1
Millet (Foxtail)	12·8	87·2	3·9	10·9	2·9	14·3	55·2	..	..	..	..	..	..	..	..
Oats	11·0	89·0	3·5	10·3	5·0	10·2	60·0	8·0	4·9	2·6	46·2	69	62	7·6	7·6
Rice (polished)	12·1	87·9	1·0	6·7	0·5	1·2	78·5	5·8	0·2	0·6	78·2	84	82	5·7	13·3
Sorghum	12·8	87·2	1·9	8·9	3·6	2·0	70·8	6·7	2·9	1·0	60·2	74	68	6·4	10·2
Wheat	11·5	88·5	1·7	11·0	2·0	2·1	71·7	9·4	1·3	1·0	65·7	79	72	8·3	7·4
Peas	14·0	86·0	2·8	22·5	1·6	5·4	53·7	19·4	1·0	2·5	49·9	77	69	18·2	2·8
Vetches	13·3	86·7	3·2	26·0	1·7	6·0	49·8	22·9	1·5	3·9	45·8	80	70	21·5	2·3
Linseed	8·0	92·0	3·8	18·5	36·0	11·5	22·2	14·8	34·3	3·7	17·8	121	117	14·3	7·3
Rape	7·3	92·7	4·2	19·6	45·0	5·9	18·0	15·9	42·8	1·5	14·4	132	130	14·8	6·4
By-products.															
Barley Bran	11·5	88·5	4·5	11·6	4·0	16·5	51·9	9·8	3·4	3·3	44·6	67	61	9·5	5·8
Barley, brewers' grains, fresh	75·0	25·0	1·0	5·1	1·5	3·5	13·9	3·7	1·3	1·4	8·6	17	13	3·6	3·6
Barley, brewers' grains, dry	10·0	90·0	2·2	18·5	4·0	15·0	50·3	13·1	3·5	7·2	28·5	60	46	12·6	3·4
Barley malt coombs, dry	9·5	90·5	5·5	24·6	1·8	13·8	44·7	20·0	1·7	12·9	32·6	69	45	16·0	2·5
Blood meal	9·5	90·5	3·0	76·0	1·5	..	10·0	69·2	1·5	..	6·7	92	66	65·0	..
Bran, wheaten	10·6	89·4	5·0	14·5	3·0	7·5	59·4	10·9	2·1	1·3	42·0	61	44	9·9	4·5
Cottonseed meal	9·7	90·3	5·5	39·0	8·0	4·5	33·3	33·7	7·6	1·2	22·5	83	70	33·0	1·3
Linseed meal	11·0	89·0	6·5	26·5	8·5	10·5	37·0	22·8	7·8	5·2	29·6	82	72	22·2	2·4
Linseed meal (extracted)	11·0	89·0	6·2	27·0	1·5	9·5	44·8	22·5	1·4	4·9	35·8	73	61	22·2	2·0
Malt, dry	7·0	93·0	2·6	13·8	3·1	9·0	64·5	11·0	2·4	4·5	56·4	78	71	9·9	6·1
Meat meal	9·5	90·5	11·5	60·0	5·5	..	13·5	56·0	10·9	..	7·5	102	84	54·5	..
Maize oil meal (maize germ meal)	6·5	93·5	1·7	21·5	14·0	9·2	47·1	17·2	12·9	5·6	39·5	94	88	17·0	4·5
Maize gluten (polly) feed	7·0	93·0	2·9	25·1	5·0	7·8	52·2	21·4	3·6	5·6	45·6	84	78	20·5	2·8
Oat bran, from preparation of oatmeal	9·0	91·0	5·5	9·6	5·0	14·6	56·3	4·8	2·8	5·7	39·9	57	49	4·6	11·0
Pea-Nut Meal	7·2	92·8	4·6	40·5	20·0	4·2	23·5	36·6	18·9	0·4	19·9	107	89	36·0	1·8
Pollard (wheaten)	10·5	89·5	3·1	15·0	4·0	5·8	61·6	11·1	3·5	1·4	51·9	75	69	10·6	5·6
Rice meal	9·3	90·7	9·0	11·8	12·0	4·5	53·4	6·9	10·1	1·1	42·2	75	71	6·5	9·9
Sugar beet pulp, wet	93·0	7·0	0·2	0·6	0·1	1·4	4·7	0·4	..	1·2	4·3	6	6	0·4	13·7
Sugar beet pulp, dry	12·0	88·0	2·5	7·6	1·3	17·6	59·0	4·5	..	15·7	53·8	75	64	4·4	15·4
Sugar beet molasses	33·7	66·3	7·2	10·0	0·1	..	49·0	3·4	..	..	44·0	45	39	1·2	12·6
Sugar cane molasses	24·0	76·0	2·2	10·0	..	..	63·8	3·7	..	..	55·3	56	49	1·2	15·0
Oat hulls or husks	8·5	91·5	6·8	1·7	0·6	33·4	49·0	·5	·1	19·0	22·5	42	21	·4	83·4
Milk	87·2	12·8	0·7	3·6	3·7	..	4·8	3·4	3·7	..	4·8	18	17	3·4	4·1
Buttermilk	90·8	9·2	0·7	3·6	0·8	..	4·1	3·4	·8	..	4·1	11	9	3·4	1·8
Dry buttermilk	9·7	90·3	8·6	32·1	5·7	..	43·9	30·4	5·7	..	43·9	94	85	30·4	2·0
Separated milk	90·4	9·6	0·8	3·8	0·1	..	4·9	3·6	·1	..	4·9	9	8	3·6	1·4
Dried skim milk	10·0	90·0	7·0	30·0	0·9	..	52·1	28·5	·9	..	52·1	87	79	28·5	2·0
Milk whey	93·4	6·6	0·7	0·7	0·2	..	5·0	0·6	0·2	..	5·0	6	6	0·6	9·2
Whey, Dried (one sample only)	2·5	97·5	8·5	14·0	0·7	..	74·3	13·3	0·7	..	74·3	92	90	13·3	5·7

Butter Production and Export

The following tables show :—

(*a*) Factory production of butter and cheese in Victoria for the period July to September, 1936, compared with the corresponding period of 1935 ; and

(*b*) Quantities and percentages of various grades of bulk butter examined in Victoria from 1st July to 31st October, 1936, in comparison with the corresponding period of 1935.

FACTORY PRODUCTION OF BUTTER AND CHEESE IN VICTORIA (QUANTITIES IN TONS).

Month.	Butter.		Cheese.	
	1936.	1935.	1936.	1935.
July	2,451†	3,039	247†	285
August	3,698†	4,365	379†	367
September	6,094†	6,159	509†	504
Totals, 3 months	12,243	13,563	1,135	1,156

† Subject to revision.

BULK BUTTER EXAMINED FOR EXPORT IN VICTORIA (QUANTITIES IN TONS).

Period.	1936. How Graded—				Total.	Period.	1935. How Graded—				Total.
	Ch.	1st.	2nd.	Pty.			Ch.	1st.	2nd.	Pty.	
1st July to 26th September ..	2,673	1,138	265	32	4,108	1st July to 28th September ..	4,009	1,611	322	37	5,979
27th September to 31st October ..	4,403	1,666	327	30	6,426	29th September to 2nd November ..	4,610	2,468	437	42	7,557
Totals 1st July to 31st October ..	7,076	2,804	592	62	10,534	Totals 1st July to 2nd November ..	8,619	4,079	759	79	13,536
Percentages ..	67·2	26·6	5·6	0·6	..	Percentages ..	63·7	30·1	5·6	0·6	..

Christmas Mails and Telegrams

THE Postal Department is seeking the co-operation of readers in the early posting of Christmas gifts and greetings to ensure their delivery before Christmas. It would like as much as possible of such mail matter posted before Friday, 18th December, and suggests that packets be endorsed " Do not open till Christmas ". The charm of these gifts and greetings lies in their receipt before Christmas Day, so shop now, pack securely, address plainly and fully, and post early.

Christmas and New Year Greeting Telegrams.

Christmas and New Year Greeting Telegrams are issued on attractively-coloured forms and enclosed in envelopes to match. They may be lodged on any day between 14th December, 1936, and 6th January, 1937. The word " Greeting " should precede the address. The usual low telegraph rates apply.

Telephone subscribers may lodge telegrams by calling " Telegrams " or by dialling J.075.

Full details are available at any Post Office.

Bull Indexing

New Methods Replace Old Ideas

By W. J. Yuill

SCIENCE and experience have overcome many of the problems of the dairy industry—the drudgery of hand milking has been largely overcome by milking machines; the separator has displaced the laborious work of the dish-setting system; pasteurization and cool storage have revolutionized the manufacturing and marketing side of the industry and, for a long time past, the scientific ensiling of green crops and balancing of rations for dairy cows have been extensively practised by progressive dairy farmers. Scientific knowledge has added greatly to the farmer's control of his dairy herd, while more recent advances in pasture improvement and fertilizing have further improved his position.

Generally, however, there has been little or no improvement in the methods of breeding dairy cattle. With the possible exception of Denmark and Holland, the average production of dairy cows cannot be said to be improving. The Australian dairy cow is averaging about 120 lb. of butter-fat; in Victoria the average yield is still around the 170–180 lb. mark. The New Zealand average yield is very little better, while in U.S.A. it is still but 160 lb. The Danes are the outstanding exception, for recent figures state the annual average production there to be 298 lb. per cow.

From time to time "new tools of trade" have been fashioned for the use of the live-stock breeder, but very little actual improvement has been achieved. With the development of the Herd Book system much has been accomplished in the matter of breed building, quite apart from the development of the dairy character. Generally this system has done all that it set out to do, viz., to tabulate the genealogical history of the families of each breed. As a rule a registered pedigree gives this information, and nothing more.

The first definite tool to be fashioned for the purpose of selecting animals for their productive capacity came in 1895, when organized herd test work was designed. That there are now 4,500,000 dairy cows under test in 34 dairying countries is sufficient evidence that test work has filled a need. But perhaps the most promising tool yet designed to assist the breeder of better dairy cattle is the "Bull Index." The great disparity that exists between the tested and non-tested cows of any country is proof of the efficiency of the "Herd Test" tool for the general improvement of masses of dairy cows; while perhaps the best proof of the value of the Bull Index in the work of herd improvement is that those who have used it longest are using it most, and that it is steadily growing in volume even against much opposition. In Denmark between 300 and 400 bulls are said to be indexed annually.

The Development of Bull Indexing.

In 1919 the U.S.A. Department of Agriculture began its campaign to provide for the use of registered sires in place of grade bulls. In 1924 the campaign was taken a step further, when it was decided to advocate that the bulls used should be not merely "registered sires," but also good conformation sons of class A.A. cows and sired by *proven* bulls. "Proof" then was taken as the yield of ten daughters. In 1926 a further adjustment was made, when "proof" was obtained from a *comparison of the records of daughters and their dams.* As recently as 1934 a further feature was included, the herd level being considered as an essential factor. Bulls are now grouped into three classes according to their ability to influence the yield of the herd—being classed as "meritorious," "mediocre," or "inferior." A similar grouping of a number of sires in use in Victorian herds tested under the V.U.C.T.A. is seen in the tables on page 640.

A Friesian bull with a high index—Mr. J. Bullingham's herd sire, and some of his grade progeny.

In 1932 the Jersey Cattle Club of America adopted the average yield of the first ten daughters as a measure of the bull's transmitting influence. This was the method adopted by the U.S.A. Department of Agriculture in 1924, criticized in 1926, and abandoned in 1930.

In 1931 the Guernsey Island Cattle Club and the English Suffolk Milk Recording Society introduced bull indexing work. Three years later the English Guernsey Society and the Holstein Friesian Society of America adopted the Mount Hope Index, as did also various other bodies throughout America, while the fifth list of bull indices was issued by the Dairy Branch of British Columbia in 1935. New Zealand Herd Test authorities are moving towards a proven bull scheme, while in Australia the Victorian United Cow Test Association, which adopted the principle in 1931, appears to be the first body to have taken up the work. It was followed in 1936 by the Red Poll Society—the work in this case being carried out by Mr. Hewitt, M.Agr.Sc., of the Werribee Research Farm.

The Basis of the Bull Index.

The basic principle of a Bull Index is the assumption that the average yield of the daughters is approximately midway between those of their parents. Although the characteristic of milk production is not expressed in the male, it is transmitted to his daughters, where it is mixed with the inheritance received from their dams. The productive ability of the daughters may therefore be expected to be between the parental levels. Probably there have been investigators in all ages, who have noted that certain characters of production acted along definite lines. In the late eighties a Danish investigator, Count Arlefeldt, noted that the cross-bred stock of Red Danish and Jersey parents exhibited a milk yield and fat percentage that was approximately midway between those of the two breeds used; this was also found to be true of the character of size. In more recent years many herd-testing farmers have noticed the same thing, particularly when Jersey sires have been used on Shorthorn or Friesian cows. In such cases the cross-bred invariably has a higher milk yield and a lower test than the average Jersey, and is also larger in size. In all three characters the cross-breds range about midway between the two parental levels.

In 1913 Dr. N. Hansen, a Swedish investigator, noted that the butter-fat tests of the progeny of high and low test parents tended to group themselves approximately half-way between the two parental levels. In the same year Professor W. H. Yapp, of Illonois, designed an index in which he placed the daughters midway between the dam and sire. *This was done only for the age-corrected milk yields*, the butter-fat yield being determined by adjusting the test to the common figure of 4 per cent. Results obtained by these and other investigators all pointed to the conclusion that the progeny of parents, one of which is relatively pure for high milk yield and the other relatively low, have milk yields approximately midway between the two parental levels. This is now known to be true also of the test character.

It will be seen from the foregoing that investigators have long sought a method by means of

which the potential qualities of a dairy sire might be measured, or at least indicated, while he was yet a young animal.

The observations of Count Arlefeldt and many breeders and farmers proved to be on sound lines, but Professor Yapp's placing of the daughters midway between the sire and dam was the first definite step made. However, hiding the butter-fat test in a single figure could hardly satisfy the owners of high-testing breeds. It was left for Dr. Goddard, Professor of Genetics at the Massachusetts Agricultural College (now of Mount Hope Farm), to prove that the progeny of high and low test parents also group themselves approximately midway between the parental levels. This finding is known to be true both within the breed and between the breeds. To assess the potential production level of the sire, therefore, it is sufficient to know the yields of his mates and their daughters.

Dr. Goddard's finding led to the now famous Mt. Hope Bull Index, in which the progeny are placed midway between the two parental levels, both for the milk yield and butter-fat characters. The Mt. Hope commercial form of index and that evolved by Kenrick and MacDowal, of the American Bureau of Dairy Industry, are both founded on the Equal Parent basis. The final results are practically identical. In the former the milk yield is age-corrected and the actual test averaged; while in the latter the test is ignored, and both the milk and butter-fat yields being age-corrected where necessary, with a final comparison of the age-corrected yields of the daughters and dams; the daughters in each instance being placed midway between the dam and sire.

At Mt. Hope Farm the "Precise Form of Index" is used. As this form is more involved than the "Commercial" one no advantage would be gained by explaining it, particularly as Dr. Goddard recommends the latter form for herd improvement work.

Preparing a Bull Index.

At the outset several contentious points arise, the first being, what is the minimum number of daughters to be used, and, secondly, how many daughter-dam pairs are considered necessary? Some authorities accept as few as five daughters and five daughter-dam pairs, but it is possible that these five daughters could be from two, or even one, dam; therefore, each could be termed a daughter-dam pair. While it is true that as few as five daughters can give some indication of a young sire's breeding worth, it will be sounder work to seek not less than ten unselected normal daughters from at least five different dams. When fewer daughters than ten, and fewer than five pairs of daughter-dams are available, the subsequent index should be used more in the nature of an indicator than proof.

Having arrived at the average age-corrected yields of the dams and their daughters the next thing is to determine the Bull Index. On the above assumptions the yield of the daughters will represent the average of the yield of the dams and the "potential yield" of the sire. If, for example, the average yield of all the dams is 365 lb. butter-fat and that of the daughters 377 lb., the index of the particular bull concerned would be 389 lb. This is arrived at by multiplying the average yield of the daughters by two

A Jersey Bull with a high index. Sire and his progeny in Messrs. Hamilton Bros. herd at Dumbalk North.

and subtracting the average yield of the dams, thus—

377 lb. × 2	= 754 lb.
Subtract average of dams	= 365 lb.
Bull Index	= 389 lb.

The same result is obtained by adding to, or subtracting from, the average yield of the daughters, the difference in yield between dams and daughters. The difference is added to the average yield of the daughters when the average yield of the latter is higher than that of their dams, and subtracted when the average yield of the daughters is lower than that of their dams. (See example on next page.)

Age Correction Factors.

A further contentious question which causes some anxiety is just which table of age-correction factors is the right one to use. It is well to remember that a great mass of work has been carried out in many countries, and that these agree very substantially. This is seen by the factors which the various investigators have arrived at for the junior two year old. All findings fall between the figures 1·5 and 1·3, the latter figures being recently established by an investigation made by the United States Bureau of Dairy Industry, when over 4,000 records of the District Herd Improvement Association cows were considered.

A very early work carried out by Professor Turner found that a two, three, and a four year old cow produced respectively 70, 80, and 90 per cent. of their mature form. This basis is used in the ready-reckoner table on page 641.

In a general way farmers agree with these findings for the old saying that "three heifers equal two mature cows" was based on this thought, which was further strengthened when early testing farmers discovered that a 200 lb. junior two year old was a potential 300 lb. cow. The age-correcting factor would be 1·5. Expressed in figures it would be $200 \times 1{\cdot}5 = 300$. The general opinion appears to suggest that this figure is somewhat high; therefore, failing any Australian data on this point, Professor Turner's figures have been taken—as was also the case at British Columbia—since they are about the average figures of all investigations.

Sometimes the questions are asked—does the index of a young bull alter to any extent, and can an index made in one herd be useful for another herd? Both questions can be answered in the affirmative; some qualifications, however, are needed. Since the index of a sire is made from the comparative averages of many individual cows, with possibly a great number of records, some variation is to be expected. The yield of any cow may vary from year to year because of one or many factors, and these alterations may affect the bull index. Despite all these influences, however, a good cow remains a good yielder (unless permanently incapacitated by accident or disease); so also a high index sire retains a high level of excellence. The greater the number of records reviewed the more valuable will be the resulting index.

It is at once evident that a sire's index cannot remain the same should he be transferred to a herd with an entirely different production level. He may lift the butter-fat yield of his daughters by 50 lb. over mates with a 200 lb. butter-fat level, yet fail badly in a 350 lb. herd. If, however, this bull had been transferred to a herd with a similar production level, then similar results may be expected.

There may be something yet to learn concerning the new practice of bull indexing. Experience may suggest some variation to the present method, to make the work simpler, and more effective. Dr. Goddard has stated that, should that occur, the index work will be altered accordingly. At the present time it can be definitely claimed that the herd-testing stud breeder and dairy farmer can build their herds more effectively by the aid of the bull index than was previously the case. When bull indexing work becomes as general as herd testing many "proved" bulls will be retained for use, while they can sire a calf—others, again on proof—will be "headed" for the butcher before they can do material harm. Extensive work is already being carried out by herd-testing officers at Winchelsea, Dumbalk North, and Stanhope. The dairy farmer's slogan should be—"Every dairy cow a tested one, and every sire an indexed one at an early age." This is not possible, except where herd testing is continuously practised.

An Age-correction Ready Reckoner.

In order to assist farmers and herd test officers who are interested in Bull Index work the ready-reckoner or table of age-corrected yields on page 641 has been prepared. The actual junior yields are found on the left-hand side of the page, while the six columns of age-corrected figures represent the expected mature equivalent of these records at the ages shown at the head of each column. The figures in the table can be used alike for gallons of milk or lb. of butter-fat. If lb. of milk

are required, these can be found by multiplying by 10. Should the more exacting worker wish to secure closer results than to the nearest 10 gallons, or 10 lb. as represented by each line on the chart, he can halve this increase by merely adding 5 to the figures on the left-hand column, and halving the age-corrected figures. This can be done by adding the figures shown at the foot of each column.

The following illustrations explain how the chart can be used. A junior two year old has produced, say, 600 gallons (6,000 lb.) milk and 240 lb. butter-fat; the age-corrected figures are shown to be 840 gallons (8,400 lb.) milk and 336 lb. butter-fat. Had the figures been 605 gallons and 245 lb. butter-fat the final figures could be found by adding "7" to each age-corrected yield, i.e., 847 gallons (8,470 lb.) milk and 343 lb. butter-fat.

The range of the figures on the table cover milk yields up to 9,000 lb., and all likely butter-fat yields above 100 lb. It is unlikely that any junior cow yields will occur outside these limits; if so, they can be multiplied out by using the factor shown at the head of each column.

The Final Stage in Making a Bull Index.

When all the age-corrected records of each mate and daughter of the bull have been brought to an average figure of milk and butter-fat, and the comparative list of dam and daughter pairs brought to a final figure, representing an average of all milk and butter-fat yields, the butter-fat percentage can then be obtained. This is done by multiplying the butter-fat by 100 and dividing by the milk, i.e.,

$$\frac{\text{Butter-fat average} \times 100}{\text{milk average.}} = \text{average test.}$$

The average yields and tests of the mates and daughters of the bull can now be compared, and the final index of the bull obtained as follow:—

—	Milk.	Test.	Butter-fat.
	lb.	%	lb.
20 mates of "Butterwinks 4th of Jersey Hill" (82 records reviewed averaged)	7,276	5·02	365
20 daughters of "Butterwinks 4th of Jersey Hill" (63 records reviewed averaged)	7,221	5·22	377
Difference in yields ..	−55	..	+12
Index of "Butterwinks 4th of Jersey Hill"—20 D–D pairs (145 records reviewed) ..	7,166	5·43	389

This bull did not raise the production materially, but he is proven to be a great herd sire, because he maintained the high production level of his mates.

It will be noted that the milk yield of the daughters is less than that of the dams, but that the average test and butter-fat are higher.

To find the sire's index in this instance, it is necessary to *subtract* the difference in the milk yields from the milk yield of the daughters, and *add* the difference in the butter-fat yield to that of the daughters. It is evident that "Butterwinks 4th" slightly reduced the average milk yield, and that he also increased the average test and butter-fat.

The dam of "Butterwinks 4th" was "Tiddlewinks 2nd of Holmswood," the champion cow of the Standard Herd Test in 1919. Several of her sons proved to be very valuable herd-sires. The mates of "Butterwinks 4th" were mainly grade daughters of "Mystery 8ths Fortune of Melrose," who was proved by herd testing to be a great herd-improver.

It sometimes occurs that a herd sire will reduce the milk yield and the test of his daughters, as in the case of the first bull in Class C on page 640. He may raise both, as in the case of other bulls shown. Sometimes the difference is slight; it may, however, be very considerable, as in the case of the leading bull in Class A also on page 640.

A bull may lower the milk yield and raise the test, or vice versa. He may raise both the milk yield and the test, or he may lower both. There are herd builders and herd wreckers in all of the well-known breeds. Just as a production record is the "measure" of a dairy cow, so the index becomes the measure of a herd sire. His influence, whether it be "for weal or woe," is clearly shown in a complete index.

Butterwinks 4th of Jersey Hill.

First Step in Preparing a Bull Index.

How to prepare one dam-daughter pair—"Daisy" and her daughter "Primrose."

Age.	Dam.	Dams Actual Yields.		Age-corrected Yields.		Age.	Daughter.	Daughter's Actual Yields.		Age-corrected Yields.	
		Milk.	Butter-fat.	Milk.	Butter-fat.			Milk.	Butter-fat.	Milk.	Butter-fat.
		lb.	lb.	lb.	lb.			lb.	lb.	lb.	lb.
6	Daisy ..	6,350	352	6,350	352	2½	Primrose ..	5,029	280	7,040	392
7	,, ..	6,807	382	6,880	384	3½	,, ..	5,617	334	6,740	401
8	,, ..	6,689	370	6,690	370	6	,, ..	6,747	418	6,747	418
9	,, ..	6,992	393	6,992	393						
10	,, ..	7,055	363	7,050	363						
				33,962	1,862					20,527	1,211
Average of 5 Mature Records .. (No Junior records in this case.)				6,792	373	Average of 3 Age-corrected Records				6,842	404

Note.—All daughter-dam pairs should be arranged as above, so that an individual comparison of all age-corrected records can be made.

Second Step in Preparing a Bull Index.

Having completed the age-correcting stage for each daughter-dam pair a comparative list is made as shown below:—

"Butterwinks 4th of Jersey Hill." (No. 4246.) (A.J.H.B.)

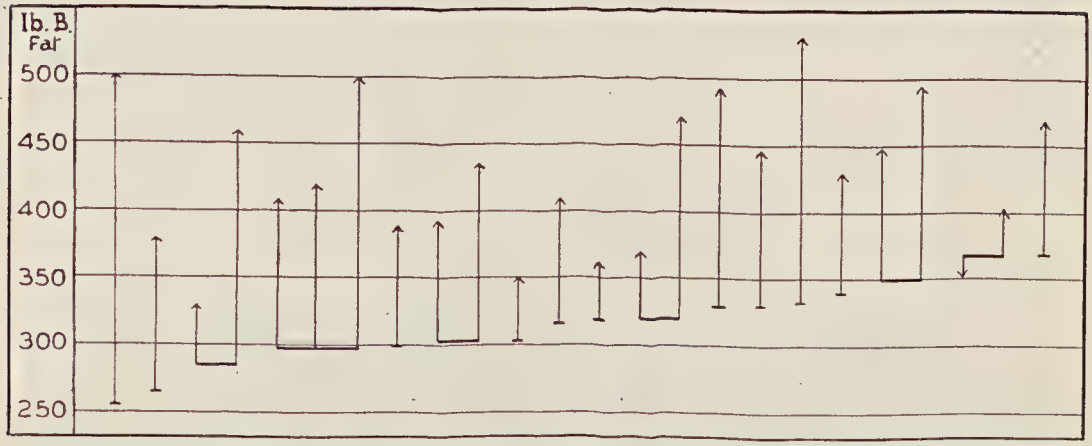
Mates of "Butterwinks 4th of Jersey Hill."

Records Averaged.	Mates.	Age-corrected Yields.		
		Milk.	Test.	Butter-fat.
		lb.	%	lb.
5	Daisy	6,790	..	373
4	Ivy	7,520	..	358
5	Grace	7,220	..	391
5	Nancy	9,360	..	440
5	Iris	7,600	..	410
4	Cecilia's Duchess of Woorayl	4,910	..	285
6	Model	8,240	..	385
3	Winnie	6,940	..	335
2	Flo	7,810	..	335
2	Mabel	6,900	..	349
1	Enid	5,750	..	220
5	Lady	7,060	..	368
3	Winnie	6,940	..	335
5	Daisy	6,790	..	373
4	Lubra	9,110	..	428
5	Nutmeg	8,030	..	387
5	Sweetheart 4th ..	7,590	..	389
4	Whiskers ..	8,190	..	395
3	Banyule Tiddle-winks	6,150	..	349
6	Glenhope Duchess	6,630	..	391
82		145,530	..	7,296
	Average yield of all mates	7,276	5·02	365

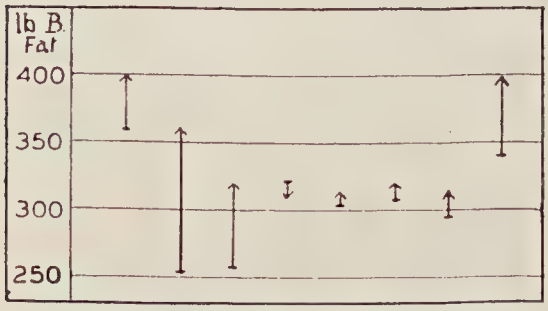
Daughters of "Butterwinks 4th of Jersey Hill."

Records Averaged.	Daughters.	Age-corrected Yields.		
		Milk.	Test.	Butter-fat.
		lb.	%	lb.
3	Primrose ..	6,840	..	404
4	Darky	7,400	..	424
5	Jessie	7,070	..	355
4	Nina	5,700	..	370
2	Wonder	7,400	..	369
4	Princess	5,980	..	380
3	Pollyanna ..	6,190	..	329
4	Faith	8,060	..	360
4	Fanny	8,450	..	434
4	Susie	8,120	..	389
5	Judy	8,330	..	410
3	Minnie	7,840	..	398
2	Patience	7,040	..	373
3	Dell	7,320	..	382
2	Silvia	8,900	..	382
2	Meg	6,830	..	389
3	Sweetlass ..	7,250	..	348
2	Wilma	6,550	..	314
1	Glenhope Tiddle-winks 2nd	7,360	..	477
3	Czarena	5,780	..	348
63		144,410	..	7,535
	Average yield of all daughters ..	7,221	5·22	377

Records of Three Bulls.

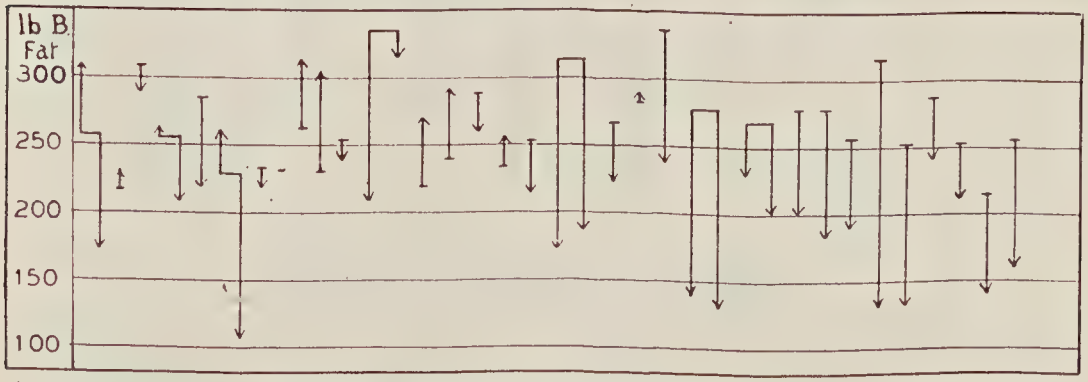


A Herd Builder—"Golden Star," a grade Jersey bull whose two-year-old daughters invariably have been higher producers than their dams. Bull's Index, 522 lb. butter-fat.



A Worthy Sire—Bull's Index, 397 lb. butter-fat.

"Golden Star."



A Herd Wrecker—the yields of his daughters have been consistently lower than those of their dams. Bull's Index, 176 lb. butter-fat.

These graphs show the influence of three sires on the yields of their herds. The arrow head shows the age-corrected yield of the daughter, while at the other end of the vertical line is the yield of the dam. Where two or more of these vertical lines are joined the yields shown are those of one dam and two or more of her daughters.

The following list, prepared from data supplied in the annual reports of the grade herd test, shows the equal parent indices of a number of sires in use in herds being tested by Grade Herd Recording Associations in Victoria. For obvious reasons the names of the bulls and of the herds are withheld.

EQUAL PARENT INDICES OF BULLS USED IN HERD RECORDING ASSOCIATIONS IN VICTORIA.

(A) *List of great Dairy Sires—some being herd builders, while others held the high yields of their mates.*

Breed of Sire.	No. of D.D. Pairs.	Records Reviewed.	Age-corrected Yields of Dams.			Age-corrected Yields of Daughters.			Sire's Index.			
			Milk.	Test.	Butter-fat.	Milk.	Test.	Butter-fat.	Milk.	Test.	Butter-fat.	
			lb.	%	lb.	lb.	%	lb.	lb.	%	lb.	
Grade Jersey ..	27	161	6,971	4·46	311	7,536	5·45	411	8,101	6·44	522	Considerably raised the milk yield and test
Unreg. Jersey..	16	66	6,960	4·5	313	7,319	4·98	364	7,678	5·46	415	Raised milk yield and test
Reg. Ayrshire..	8	34	7,029	4·4	309	7,896	4·47	353	8,763	4·53	397	,, ,,
Reg. Jersey ..	18	97	6,739	4·63	312	6,695	5·17	356	6,651	6·0	400	Slightly lowered yield, but greatly raised test
Unreg. Jersey..	25	191	6,982	5·24	366	6,706	5·64	378	6,430	6·07	390	Lowered yield, raised test
Reg. Jersey ..	15	82	9,308	4·27	398	8,713	4·62	403	8,118	5·02	408	Slightly lowered yield, slightly raised test
Reg. Jersey ..	20	110	7,340	5·31	390	7,360	5·32	392	7,380	5·34	394	Held high figures for milk yield and test

(B) *List of Bulls that proved unequal to the task of materially raising or holding the yields of their daughters, when mated to cows of average quality.*

Reg. Jersey ..	19	104	6,388	4·27	283	5,642	5·07	276	4,996	5·4	269	Lowered yield, but raised test
Reg. Ayrshire..	10	37	6,332	4·18	265	6,468	4·26	276	6,602	4·34	287	Raised yield and test
Grade Ayrshire	9	49	6,313	4·61	291	6,466	4·38	283	6,619	4·15	275	Raised the milk and lowered test
Reg. Ayrshire..	10	34	6,333	4·18	265	6,468	4·26	276	6,602	4·34	287	Raised milk and test
Reg. Jersey ..	16	33	6,262	4·39	275	5,867	4·68	275	5,471	4·97	275	Lowered milk, and raised test
Reg. Jersey ..	13	43	7,238	4·97	351	5,576	5·56	310	3,914	6·9	269	Greatly lowered milk, considerably raised test
Reg. Jersey ..	11	49	6,333	5·2	328	5,078	5·82	296	3,841	6·8	264	Lowered milk, raised test

(C) *The class of Bull that nobody wants—they were unable to favourably influence the butter-fat yields even when mated to poor producing cows.*

Reg. Shorthorn	39	171	6,308	4·2	264	5,723	3·8	215	5,144	3·42	176	Greatly lowered milk and test
Reg. Ayrshire..	8	25	4,839	4·03	195	4,910	3·88	190	4,981	3·76	185	Slight increase in milk, lowered test
Grade Ayrshire	11	53	5,333	4·06	217	4,610	4·34	200	3,887	4·52	183	,, ,,
Reg. Jersey ..	7	21	5,705	4·23	241	4,473	4·81	215	3,241	5·39	190	,, ,,
Aust. Illawarra Shorthorn	10	24	4,488	4·4	197	5,078	4·14	210	5,326	3·97	212	Raised milk, but lowered test
Reg. Jersey ..	8	37	6,334	4·41	288	5,193	4·63	240	3,843	4·83	192	Lowered milk, but raised test

Table of Age-corrected Milk and Butter-fat Yields for Use in Bull Index Work.

The figures of the left-hand column represent the actual yields of a junior cow; those in the age-corrected columns are the anticipated mature yields made by junior cows of the age shown at the head of each column, together with the correcting factor for each age. By adding a "0" to the gallon, yields can be converted into lb. of milk.

This column represents a Junior Cow's yield. The figures can be used for gals. of Milk or lb. Butter-fat.	Age at Beginning of Lactation and Correction Factors for Each Age.					
	2 yr.	2½ yr.	3 yr.	3½ yr.	4 yr.	4½ yr.
	1·4	1·3	1·25	1·2	1·11	1·08
	Age-corrected Mature Yields.					
100	140	130	125	120	111	108
110	154	143	137	132	122	118
120	168	156	150	144	133	129
130	182	169	162	156	144	140
140	196	182	175	168	155	151
150	210	195	187	180	166	162
160	224	208	200	192	177	172
170	238	221	212	204	188	183
180	252	234	225	216	199	194
190	266	247	237	228	210	205
200	280	260	250	240	222	216
210	294	273	262	252	233	226
220	308	286	275	264	244	237
230	322	299	287	276	255	248
240	336	312	300	288	266	259
250	350	325	312	300	277	270
260	364	338	325	312	288	280
270	378	351	337	324	299	291
280	392	364	350	336	310	302
290	406	377	362	348	321	313
300	420	390	375	360	333	324
310	434	403	387	372	344	334
320	448	416	400	384	355	345
330	462	429	412	396	366	356
340	476	442	425	408	377	367
350	490	455	437	420	388	378
360	504	468	450	432	399	388
370	518	481	462	444	410	399
380	532	494	475	456	421	410
390	546	507	487	468	432	421
400	560	520	500	480	444	432
410	574	533	512	492	455	442
420	588	546	525	504	466	453
430	602	559	537	516	477	464
440	616	572	550	528	488	475
450	630	585	562	540	499	486
460	644	598	575	552	510	496
470	658	611	587	564	521	507
480	672	624	600	576	532	518
490	686	637	612	588	543	529
5	7	6·5	6·25	6	5·5	5

This column represents a Junior Cow's yield. The figures can be used for gals. of Milk or lb. Butter-fat.	Age at Beginning of Lactation and Correction Factors for Each Age.					
	2 yr.	2½ yr.	3 yr.	3½ yr.	4 yr.	4½ yr.
	1·4	1·3	1·25	1·2	1·11	1·08
	Age-corrected Mature Yields.					
500	700	650	625	600	555	540
510	714	663	637	612	566	550
520	728	676	650	624	577	561
530	742	689	662	636	588	572
540	756	702	675	648	599	583
550	770	715	687	660	610	594
560	784	728	700	672	621	604
570	798	741	712	684	632	615
580	812	754	725	696	643	626
590	826	767	737	708	654	637
600	840	780	750	720	666	642
610	854	793	762	732	677	658
620	868	806	775	744	680	669
630	882	819	787	756	699	680
640	896	832	800	768	710	691
650	910	845	812	780	721	702
660	924	858	825	792	732	712
670	938	871	837	804	743	723
680	952	884	850	816	754	734
690	966	897	862	828	765	745
700	980	910	875	840	777	756
710	994	923	887	852	788	766
720	1,008	936	900	864	799	777
730	1,022	949	912	876	810	788
740	1,036	962	925	888	821	799
750	1,050	975	937	900	832	810
760	1,064	988	950	912	843	820
770	1,078	1,001	962	924	854	831
780	1,092	1,014	975	936	865	842
790	1,106	1,027	987	948	876	853
800	1,120	1,040	1,000	960	888	864
810	1,134	1,053	1,012	972	899	874
820	1,148	1,066	1,025	984	910	885
830	1,162	1,079	1,037	996	921	896
840	1,176	1,092	1,050	1,008	932	907
850	1,190	1,105	1,062	1,020	943	918
860	1,204	1,118	1,075	1,032	954	928
870	1,218	1,131	1,087	1,044	965	939
880	1,233	1,144	1,100	1,056	976	950
890	1,246	1,157	1,112	1,068	987	961
900	1,260	1,170	1,125	1,080	999	972
5	7	6·5	6·25	6	5·5	5

Standard Herd Records

For Quarter ended 30th September, 1936

In the following is set out the records of all cows which completed a lactation during the quarter. The number is 511, of which 350 qualified for the certificate. The figure in brackets after the owner's name shows the number of entries.

The amount of butter-fat required for qualification varies according to the age of the animal (up to five years at time of calving), the standard being as follow:—

Junior 2 year old (under 2½ years at time of calving)	230 lb. butter fat.
Senior 2 year old (between 2½ and 3 years at time of calving)	250 lb. butter fat.
Junior 3 year old (between 3 and 3½ years at time of calving)	270 lb. butter fat.
Senior 3 year old (between 3½ and 4 years at time of calving)	290 lb. butter fat.
Junior 4 year old (between 4 and 4½ years at time of calving)	310 lb. butter fat.
Senior 4 year old (between 4½ and 5 years at time of calving)	330 lb. butter fat.
Mature cow 5 years and over	350 lb. butter fat.

(Except where otherwise stated, the period of Test was 273 days.)

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Alston, N. B., Romsey, Jersey (9).										
Rosyth Bonnie Maid ..	50496	20.11.35	12	5,577	5·08	283·16	270	Jr. 3	249 ..	Aveley Antony
Rosyth Brown Eyes ..	50497	24.11.35	7	4,883	5·27	257·57	270	Jr. 3	229 ..	Aveley Antony
Rosyth Gay Grevillea ..	Vol. 23	23.10.35	13	5,810	5·00	290·33	230	Jr. 2	.. ..	Werribee Gaypiece
Rosyth Gay Princess ..	Vol. 23	5.11.35	15	6,344	5·13	325·28	230	Jr. 2	.. ..	Werribee Gaypiece
Rosyth Grevillea	46068	21.11.35	7½	5,461	5·53	301·80	310	Jr. 4	250, 300 ..	Aveley Antony
Rosyth Meadow Lark ..	Vol. 23	3.10.35	10	5,628	5·86	329·55	230	Jr. 2	.. ..	Werribee Gaypiece
Rosyth Princess Rosalie ..	50505	8.10.35	12½	7,577	4·45	337·25	270	Jr. 3	256 ..	Aveley Antony
Rosyth Rosebud ..	46073	8.10.35	9	7,331	5·44	398·86	310	Jr. 4	246, 290 ..	Aveley Antony
Rosyth Sweetbread ..	50506	19.12.35	16½	5,022	5·26	264·23	270	Jr. 3	235 ..	Aveley Antony
Atkinson, W. K., Swan Hill, Dairy Shorthorn (21).										
Willow Park Blush 3rd ..	D.S.H. B.A.	23.12.35	24½	9,972	4·37	435·54	350	Mature	375, 548, 562	Willow Park Design
Willow Park Blush 5th ..	D.S.H. B.A.	8.10.35	22	10,698	4·00	427·79	310	Jr. 4	393, 430 ..	Willow Park Banker 2nd
Willow Park Camelia 7th ..	D.S.H. B.A.	24.12.35	31	13,757	4·35	597·83	350	Mature	426, 472, 576	Willow Park Design
Willow Park Camelia 9th ..	D.S.H B.A.	4.10.35	21½	8,964	4·38	392·80	270	Jr. 3	347 ..	Willow Park Imperial 3rd
Willow Park Comet 2nd ..	D.S.H. B.A.	27.10.35	18	11,871	3·55	420·83	350	Mature	239, 311, 363, 348, 339, 458, 488	Willow Park Count
Willow Park Comet 7th ..	D.S.H. B.A.	1.10.35	26½	13,298	3·73	496·54	350	Mature	284, 378, 446	Willow Park Design
Willow Park Countess 4th ..	D.S.H. B.A.	27.10.35	10½	10,238	4·21	430·58	350	Mature	283, 364, 399, 380, 381, 449	Willow Park Revenue
Willow Park Countess 9th ..	D.S.H. B.A.	5.11.35	23½	11,091	4·00	443·46	350	Mature	396, 489 ..	Willow Park Imperial 2nd
Willow Park Countess 10th	D.S.H. B.A.	17.12.35	31½	10,631	3·81	405·34	330	Sr. 4	371, 415 ..	Willow Park Reflector
Willow Park Dainty 11th ..	D.S.H. B.A.	18.10.35	19½	7,140	3·99	284·98	230	Jr. 2	.. ..	Willow Park Royalist
Willow Park Damsel 2nd ..	D.S.H. B.A.	21.10.35	16½	9,387	4·55	426·70	350	Mature	361, 452, 428, 531, 422, 502	Willow Park Reflector
Willow Park Damsel 3rd ..	D.S.H. B.A.	24.11.35	21	9,677	4·44	429·73	270	Jr. 3	382 ..	Willow Park Imperial 3rd
Willow Park Damsel 4th ..	D.S.H. B.A.	11.10.35	17½	6,837	3·75	256·63	230	Jr. 2	.. ..	Willow Park Lustre 3rd
Willow Park Duchess 7th ..	D.S.H. B.A.	12.10.35	20½	9,846	4·21	414·16	350	Mature	262, 265, 364, 346, 365, 433, 401, 385	Willow Park Count
Willow Park Duchess 15th..	D.S.H. B.A.	25.11.35	12½	8,535	4·13	352·64	350	Mature	261, 352, 351	Willow Park Eminent
Willow Park Duchess 19th..	D.S.H. B.A.	17.11.35	22	11,243	3·93	441·83	310	Jr. 4	403 ..	Willow Park Governor
Willow Park Duchess 20th..	D.S.H. B.A.	29.10.35	24½	10,964	3·86	423·14	310	Jr. 4	286, 351 ..	Willow Park Governor
Willow Park Duchess 26th..	D.S.H. B.A.	28.11.35	17	6,738	4·46	300·26	230	Jr. 2	.. ..	Willow Park Imperial 3rd
Willow Park Melba 4th ..	D.S.H. B.A.	5.10.35	14½	10,439	4·16	434·53	350	Mature	333, 285, 362, 394, 480	Willow Park Sovereign 2nd

STANDARD HERD RECORDS—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Atkinson, W. K., Swan Hill—*continued.*										
Willow Park Moss Rose 6th	D.S.H.B.A.	6.10.35	15½	7,452	3·79	282·69	270	Jr. 3	.. ..	Willow Park Imperial 3rd
Willow Park Queenie 32nd	D.S.H.B.A.	13.12.35	N.O.C.	5,882	3·87	227·39	230	Jr. 2	.. ..	Willow Park Imperial 3rd
Axford, W., Camperdown, Jersey (1).										
*Leura Boronia 2nd ..	28857	20.10.35	..	8,310	4·50	373·86	350	Mature	374, 424 ..	Curiosity King of Comely Banks
Bassett-Smith, C., Kyabram, Red Poll (3).										
Temperley Daisy Plane ..	..	2.10.35	11	5,343	4·19	223·97	230	Jr. 2	.. ..	Temperley Dairyman
Temperley Dove 2nd ..	3858A	27.11.35	12½	6,536	4·53	295·96	310	Jr. 4	268, 278 ..	Earl of Beaconsfield
Victoria Turban	2340A	14.12.35	12½	6,639	3·98	264·06	350	Mature	298, 366, 421, 394, 355, 223	Victoria Air Marshall
Bidgood Bros., Staghorn Flats, Jersey (8).										
Staghorn Aldan's Clementine	46196	2.12.35	19½	6,977	5·28	368·16	290	Sr. 3	319 ..	La Sente's Lord Aldan (Imp.)
Staghorn Aldan's Clementine 2nd	50637	1.12.35	22½	7,466	5·70	425·78	270	Jr. 3	.. ..	La Sente's Lord Aldan (Imp.)
Staghorn Aldan's Larkspur 2nd	50638	12.10.35	23	7,298	5·76	420·68	270	Jr. 3	.. ..	La Sente's Lord Aldan (Imp.)
Staghorn Clementine's Gladness	46198	30.11.35	23½	8,384	4·90	410·55	310	Jr. 4	385 ..	Werribee Northern Masterpiece
Staghorn Lady Cello ..	46201	31.10.35	20½	6,558	4·72	309·22	250	Sr. 2	.. ..	La Sente's Lord Aldan (Imp.)
Staghorn Master's Grace ..	46202	30.10.35	24	7,050	6·50	458·12	310	Jr. 4	253 ..	Werribee Northern Masterpiece
Staghorn Northern Fern ..	Vol. 23	2.10.35	16	4,801	5·49	263·37	230	Jr. 2	.. ..	Nancy's Noble (Imp.)
Staghorn Sweet Clementine 3rd	46203	30.9.35	17½	6,278	5·73	359·57	310	Jr. 4	246 ..	Werribee Northern Masterpiece
Black, I. S., Noorat, Ayrshire (2).										
Mount Noorat Alert 2nd ..	26585	30.10.35	5½	5,960	4·09	244·06	270	Jr. 3	279 ..	Scottish Hero of Gowrie Park
Mount Noorat Peggy 2nd ..	27559	6.10.35	16½	6,879	4·03	277·29	230	Jr. 2	.. ..	Gowrie Park Soldier
Box, Dr. J., Estate of the late, Noojee, Jersey (5).										
†Toorongo Master's Queen	C.R.	8.12.35	4	1,710	5·04	86·23	230	Jr. 2	.. ..	Toorongo Master Clement
‡Toorongo Princess Daisy ..	42269	21.11.35	4	2,160	5·56	120·06	290	Sr. 3	67 ..	Toorongo Mercedes King
‡Toorongo Princess Eleanore	28481	9.12.35	4	2,940	6·10	179·25	350	Mature	237, 104, 270	Sunset of Melrose
§ Toorongo Twylish Queen	33011	12.11.35	4	3,315	4·65	154·23	350	Mature	144, 191, 194, 164	Toorongo Mercedes King
‡Toorongo Daphne ..	C.R.	27.11.35	4	2,160	5·28	114·00	230	Jr. 2	.. ..	Toorongo Master Clement
Box, Dr. J., Estate of the late, Whittlesea, Jersey (8).										
Bellefaire Bijou Belle ..	26739	24.10.35	19	7,356	4·90	360·26	350	Mature	348, 352, 399	Sherborne Wyandotte's Distinction
Edmonton Chevy ..	33210	3.11.35	9½	7,259	5·20	377·81	350	Mature	328, 464, 501, 492	Big Chief of Glen Iris
Toorongo Jessie	42264	1.10.35	13½	6,434	5·29	340·07	290	Sr. 3	305 ..	Werribee Lord Fancy
Toorongo Poppy's Beata ..	Vol. 23	15.10.35	11	3,933	4·26	167·68	230	Jr. 2	.. ..	Bellefaire Poppy's You'll Do
Toorongo Postmark's Jessie	Vol. 23	28.9.35	12	5,171	5.50	284 59	230	Jr. 2	.. ..	Bellefaire Postmaster's Postmark
Toorongo Postmark's Ruthinia	Vol. 23	27.9.35	8	4,436	6·05	268·43	250	Sr. 2	.. ..	Bellefaire Postmaster's Postmark
Toorongo Queen Bess ..	33010	18.11.35	12½	5,078	6·11	310·37	350	Mature	355, 407, 344	Ruhbank Larkspur's Admiral
¶Toorongo Queen Elizabeth	Vol. 23	2.10.35	4	2,910	5.67	165.12	230	Jr. 2	.. ..	Kantara Don Juan
Broad, A. A., Sutton Grange, Jersey (5).										
Glenoshea Velveteen ..	28494	10.11.35	16	6,963	4·93	343·26	350	Mature	245, 347, 393, 408, 385	Burnside Mooltan
Grangelea Rosebud 5th ..	36967	30.9.35	16	7,106	5·52	392·26	330	Sr. 4	336, 370, 396	Banyule Macon
Grangelea Roseleaf 3rd ..	33041	27.9.35	19½	8,486	5·67	481·33	350	Mature	326, 404, 399, 457	Banyule Airo
Grangelea Rosella 4th ..	Vol. 23	16.12.35	16	5,630	5·75	323·54	230	Jr. 2	.. ..	Grangelea Cream Boy
Bunty 2nd of Coliban ..	15485	13.10.35	25	10,020	4·98	499·42	350	Mature	365, 442, 483, 558, 582, 546, 555, 618, 530, 512	Carrie's Boy of Coliban
Butcher, F. T., Swan Hill, Red Poll (3).										
Maryville Elva	3722A	15.12.35	22	8,373	4·80	401·71	250	Sr. 2	304 ..	Victoria King Bird
Maryville Etta	Vol. 8	30.11.35	20	7,041	4.83	340.31	230	Jr. 2	.. ..	Victoria Viking
Maryville Eve	2506C	9.11.35	21½	10,305	5·09	524·76	350	Mature	355, 362, 493, 496	Victoria King Bird
Calf, A. J., Werribee South, Jersey (1).										
Clarendon Eyre Tangerine 4th	39261	3.10.35	19¼	8,376	4·87	408·27	350	Mature	.. ..	Clarendon Eyre Happy Husband

* 210 days in test, herd withdrawn. † 150 days in test. ‡ 180 days in test. § 210 days in test. ¶ 240 days in test.

Standard Herd Records—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Chadderton, J. E., Hamilton, Jersey (1).										
Glen Leigh Doris 3rd ..	37039	7.10.35	11½	7,089	5·26	372·85	330	Sr. 4	434, 493 ..	Strathkellar Topthorn
Chirnside, R. M., Whittlesea, Jersey (5).										
Mornmoot Clementine ..	41121	27.10.35	22	8,993	6·26	562·89	290	Sr. 3	331, 549 ..	Werribee Prince Madeira
Mornmoot Fancy Madeira ..	37059	17.10.35	29	11,631	5·22	607·26	330	Sr. 4	280, 434, 579	Werribee Prince Madeira
Mornmoot Princess Madeira	37071	21.10.35	38	14,480	5·48	794·03	330	Sr. 4	424, 572, 773	Werribee Grandmaster
Mornmoot Princess Madeira 2nd	45268	10.11.35	10	9,600	6·09	584·41	250	Sr. 2	480 ..	Mornmoot Starbright King
Mornmoot Princess Madeira 5th	49660	1.10.35	16½	6,693	6·41	428·96	230	Jr. 2	.. ..	Werribee Jupiter
Chitty, C., Kongwak, Jersey (4).										
Ewelme Coronet	Vol. 23	3.12.35	10	4,065	5·62	228·47	230	Jr. 2	.. ..	Ewelme Brown Prince
Ewelme Eastern Elaine ..	43836	18.11.35	6	5,417	5·01	271·62	310	Jr. 4	256, 309 ..	Northern Master of Glen Iris
Ewelme Girl	15467	1.10.35	13	6,908	5·30	366·12	350	Mature	499, 572, 630, 512, 329, 465, 477	Werribee Wyandotte's Fancy
Ewelme Northern Pearl ..	48096	15.12.35	10½	4,352	5·57	242·50	270	Jr. 3	242 ..	Northern Master of Glen Iris
Clarke, F. W., Toora, Jersey (1).										
Mer-Vue Choice 2nd ...	45131	29.9.35	N.O.C.	6,317	6·45	407·49	310	Jr. 4	309 ..	Tooravale Silver King
Clark, P. W., Whittlesea, Jersey (3).										
Coodardy Gentle Annette 2nd	Vol. 23	4.10.35	16½	6,335	4·95	313·69	230	Jr. 2	.. ..	Bellefaire Postmaster's Postmark
Coodardy Gloria	33167	23.10.35	16½	7,398	5·91	436·91	350	Mature	349, 451, 442, 474	Laane Lad Twylish
Coodardy Gloria 7th ..	C.R.	20.11.35	14	4,440	5·47	242·88	230	Jr. 2	.. ..	Tooronzo Belle's Bonaparte
Colenso, L. W. R., Alvie, Jersey (2).										
Ilma of Hazelbrook ..	18668	12.10.35	7½	6,323	4·49	283·82	350	Mature	441, 458, 495, 569, 425, 383	Progress of Colac
Normandie Thelma 3rd ..	45475	17.11.35	24½	6,542	5·52	360·89	290	Sr. 3	325 ..	Peer of Lewisham
Coughlin, C., Catani, Jersey (7).										
Fairview Carman 3rd ..	37915	27.11.35	18	5,771	4·98	287·65	350	Mature	246 ..	Burnside Royalist
Fairview Mavis 5th ..	39728	23.11.35	18	5,385	5·08	273·71	290	Sr. 3	.. ..	Fairview Cream Chief
Glady's Park Dinah ..	Vol. 23	26.10.35	15	4,362	5·76	251·29	230	Jr. 2	.. ..	Banyule Silverstrain
Glady's Park Goldmine's Beauty 2nd	43937	1.12.35	21	7,244	5·54	401·23	290	Sr. 3	307 ..	Werribee Bluebell's Masterpiece
Glady's Park Master's Petal 2nd	Vol. 23	2.11.35	17	5,340	5·29	282·34	230	Jr. 2	.. ..	Werribee Bluebell's Masterpiece
Glady's Park Starbright 2nd	Vol. 23	31.10.35	11	5,583	5·63	314·52	230	Jr. 2	.. ..	Banyule Silverstrain
Kooreena Lulu 4th ..	34102	1.10.35	9	4,616	5·96	275·22	350	Mature	296, 263, 297	Kooreena Carrie 3rd's Delegate
Coulthard, J. L. and Sons, Whittlesea, Jersey (4).										
Brookfield Rosalind 22nd ..	47445	6.10.35	20	5,669	6·11	346·50	290	Sr. 3	.. ..	Brookfield Ewell
Kameruka Symbol ..	40477	8.10.35	19½	6,729	5·02	338·11	330	Sr. 4	281 ..	Banyule Amplifier
Strathview Buttercup 3rd's Iris	Vol. 23	19.11.35	11½	4,965	4·99	247·65	250	Sr. 2	.. ..	Bonnay Carrie's Nobleman
Strathview Daisy ..	50699	10.11.35	18	5,344	4·63	247·18	270	Jr. 3	.. ..	Bonnay Carrie's Nobleman
Dee, J., Clyde North, Jersey (6).										
Aveley Melista	25410	10.10.35	5	5,573	4·77	266·09	350	Mature	301, 383, 390, 223	Choirmaster of Banyule
Aveley Norma 3rd ..	25411	29.9.35	9	5,729	4·37	250·56	350	Mature	293, 358, 382, 318	Economist of Aveley
Clydevale Cassie	39290	8.11.35	4	4,758	4·17	198·35	290	Sr. 3	263, 257 ..	Banyule Aristocrat
Clydevale Cora 2nd ..	C.R.	4.10.35	11	3,545	5·89	208·96	230	Jr. 2	.. ..	Banyule Blende
Clydevale Coreen ..	39291	4.11.35	10	5,096	4·91	249·79	310	Jr. 4	266, 304 ..	Staghorn Master Defiance
Clydevale Jewel	39293	1.10.35	9	4,752	5·34	253·64	290	Sr. 3	244, 290 ..	Banyule Aristocrat
De La Rue, N. C., Weering, Jersey (1).										
Lucerne Vale Madeira 3rd ..	49243	10.12.35	20	5,235	5·41	283·02	230	Jr. 2	.. ..	Lucerne Vale Grandmaster
Department of Agriculture, Werribee, Friesian (2).										
Victoria Domino ..	Vol. 13	17.11.35	24½	9,318	3·72	346·99	270	Jr. 3	362 ..	Victoria Joyous Mercedes
Victoria Joyous Piebe ..	3259	16.10.35	25½	14,220	3·36	478·05	350	Mature	381, 374, 500, 539, 546	Victoria Joyous Mercedes
Department of Agriculture, Werribee, Red Poll (21).										
Victoria Amaranth ..	3006A	15.10.35	14	8,372	4·10	343·25	350	Mature	248, 287, 342	Vice Regal
Victoria Asphodel ..	3008A	14.12.35	18	8,738	3·75	327·37	350	Mature	295, 322 ..	Dominion Bright Belgian
Victoria Bellibone ..	4504AA	19.12.35	22	6,173	3·44	212·61	250	Sr. 2	.. ..	Victoria Gallant
Victoria Blue Eye ..	4883A	3.12.35	16	7,380	4·17	307·96	230	Jr. 2	.. ..	Dominion Bright Belgian
Victoria Bursary	4884A	12.12.35	13	5,156	5·15	265·40	230	Jr. 2	.. ..	Dominion Bright Belgian
Victoria Clear Vision ..	3014A	5.12.35	13½	6,791	3·79	257·53	330	Sr. 4	241, 328 ..	Dominion Bright Belgian
Victoria Curlicue	4505AA	19.11.35	17	5,840	4·62	269·89	230	Jr. 2	.. ..	Victoria Gallant
Victoria Debutante ..	3513AA	30.9.35	11	6,632	4·32	286·31	290	Sr. 3	261 ..	Victoria Royal Ringer
Victoria Eructation ..	3226C	1.10.35	13	8,915	4·43	395·21	350	Mature	338, 369, 340, 365	Victoria Volcano
Victoria Friesia	5060B	15.10.35	15	6,321	4·18	264·47	230	Jr. 2	.. ..	Victoria Royal Ringer

STANDARD HERD RECORDS—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Department of Agriculture, Werribee—*continued.*										
Victoria Gilpey	4048B	5.11.35	9½	6,864	3·55	243·45	310	Jr. 4	.. ..	Dominion Bright Belgian
Victoria Lady Velvet ..	2758	1.10.35	18	8,660	4·13	357·96	330	Sr. 4	254, 333 ..	Earl of Beaconsfield
*Victoria Majesty ..	2090AA	13.10.35	4	5,543	4·20	232·93	350	Mature	219, 242, 284, 311	Vice Regal
Victoria Marsupalia ..	3916A	26.10.35	16½	6,215	4·67	289·93	270	Jr. 3	.. ..	Dominion Bright Belgian
Victoria May Queen ..	3514AA	2.11.35	19	7,667	3·89	297·94	290	Sr. 3	271 ..	Victoria Royal Ringer
Victoria Nectarine ..	3917A	30.11.35	15½	6,464	4·34	280·47	270	Jr. 3	254 ..	Victoria Royal Ringer
Victoria Nicotina ..	3027A	2.11.35	12	8,388	4·19	351·68	350	Mature	323, 320, 313	Earl of Beaconsfield
Victoria Royal Red Cross ..	4506AA	1.10.35	8	5,150	4·16	214·32	230	Jr. 2	.. ..	Victoria Royal Ringer
Victoria Venetia	4895AA	3.12.35	15½	5,369	4·72	253·59	230	Jr. 2	.. ..	Victoria John Bull
Victoria Volt	4049B	5.11.35	13½	8,913	4·46	397·88	310	Jr. 4	296, 369 ..	Victoria Vice Captain
Victoria Wild Rose ..	3042A	18.12.35	8½	6,630	4·52	299·80	350	Mature	228, 269, 313, 315	Vice Regal
Desmond, J. J., Rochester, Jersey (11).										
Macroom Edna	40852	4.11.35	16½	8,588	5·09	437·14	350	Mature	380, 399, 451	Belgonia Battery
Macroom Edna 4th ..	Vol. 23	11.10.35	17	6,324	5·66	357·84	230	Jr. 2	.. ..	Glenalvie Statesman
Macroom Fairy	C.R.	16.10.35	6½	4,638	5·88	272·76	270	Jr. 3	259 ..	Belgonia Battery
Macroom Fern Dell ..	44992	4.11.35	17	8,124	5·02	407·57	310	Jr. 4	334, 421 ..	Belgonia Battery
Macroom Graceful Duchess	C.R.	28.11.35	4	5,382	5·11	275·27	230	Jr. 2	.. ..	Macroom Mortimer
Macroom Peggy	44993	17.11.35	4	6,127	5·45	333·77	350	Mature	352, 415, 490	Belgonia Battery
Macroom Peggy 3rd ..	C.R.	6.10.35	10½	4,878	5·01	244·51	230	Jr. 2	.. ..	Glenalvie Statesman
Macroom Sweet Nell 2nd ..	C.R.	30.11.35	17	5,564	4·99	277·84	230	Jr. 2	.. ..	Glenalvie Statesman
Taranah Fairy	16716	2.12.35	4	8,250	6·00	495·15	350	Mature	351, 445, 457, 484, 485, 453, 474, 558, 560, 558	Lily 6th's Son of Melrose
Waratta Edna Bell ..	28660	13.10.35	20	9,524	5·31	505·58	350	Mature	383, 409, 399, 514, 472, 508	Jubilee Lifelight
Waratta Ellen Bell ..	28661	9.10.35	18	9,608	5·06	486·53	350	Mature	392, 445, 479, 450, 464, 517	Jubilee Lifelight
Dobson, R. J. M., Acheron, Jersey (1).										
Wattle Grove Jessica ..	Vol. 23	22.12.35	21	5.043	4·91	247·79	230	Jr. 2	.. ..	Fairview Chief
Donelan, Mrs. M. A., Lower Ferntree Gully, Friesian (5).										
Bolero Grietje	Vol. 13	25.10.35	11	5,117	3·53	180·69	250	Sr. 2	.. ..	St. Albans Queen's Korndyke 2nd
Bolero Inka Blanchje ..	3352	29.11.35	18	11,941	3·42	408·61	350	Mature	312, 343, 348, 462	Burnbank Inka Sylvia's Lad
Bolero Suse	Vol. 13	6.11.35	14	6,420	3·65	234·43	270	Jr. 3	245 ..	St. Albans Queen's Korndyke 2nd
Bolero Sylvia Clasina ..	Vol. 13	28·10.35	25	11,567	3·04	352·11	310	Jr. 4	288, 392 ..	St. Albans Queen's Korndyke 2nd
Bolero Wilhelmina ..	C.R.	7.10.35	17	6,896	3·56	245·48	230	Jr. 2	.. ..	St. Albans Queen's Korndyke 2nd
Dookie Agricultural College, Dookie, Ayrshire (1).										
Dookie Lilac	27119	9.10.35	20	8,793	3·96	348·10	290	Sr. 3	450 ..	Dookie Emblem
Enders, N. H., Stanhope, Jersey (4).										
Rintoul View Moleen ..	37338	7.11.35	24	10,002	6·41	641·36	350	Mature	495, 588, 676	Banyule Triplane
Rintoul View Rosemary ..	38214	11.12.35	19	7,811	6·10	476·61	350	Mature	441, 450, 579	Banyule Triplane
The Wattles Pearl 3rd ..	42210	7.10.35	22	10,135	5·42	549·25	310	Jr. 4	359, 494 ..	The Wattles Biplane
The Wattles Seville 4th ..	50861	27.9.35	7	4,955	5·81	287·64	230	Jr. 2	.. ..	The Wattles Biplane
Esler, G., Tongala, Jersey (6).										
Maiwand Carnation ..	49342	28.10.35	9	5,649	4·76	268·87	270	Jr. 3	220 ..	Aveley Rex
Maiwand Carnation 2nd ..	Vol. 23	9.10.35	13½	7,358	4·73	347·80	230	Jr. 2	.. ..	Maiwand Bonnie Boy
Maiwand Ivy	49344	11.10.35	5½	6,503	4·84	314·68	250	Sr. 2	.. ..	Aveley Rex
Maiwand Lavender 2nd ..	Vol. 23	21.10.35	8½	4,802	5·51	264·64	230	Jr. 2	.. ..	Aveley Rex
Maiwand Marigold 2nd ..	Vol. 23	19.10.35	6	5,628	4·91	276·22	230	Jr. 2	.. ..	Aveley Rex
Maiwand Primrose 2nd ..	49347	30.10.35	9	5,322	5·37	286·03	250	Sr. 2	230 ..	Aveley Rex
Evans, A., Heywood, Jersey (4).										
Boronia Farm Alfalfa ..	37361	1.11.35	11½	6,342	4·78	302·76	350	Mature	283, 305, 385	Boronia Farm Prince
*Boronia Farm Lassie ..	37394	11.11.35	4	5,235	4·46	233·31	350	Mature	319, 249, 332	Boronia Farm Prince
Glenloth Glory 3rd ..	C.R.	21.10.35	11½	6,035	4·76	287·32	270	Jr. 3	309 ..	Avalon Noble 14th
Rosemont Peerless 3rd ..	33331	31.10.35	13½	7,380	5·32	392·39	350	Mature	312, 396, 468	Rosella 2nd's Noble of Rosemont
Fairchild and Clutterbuck, Tinamba, Jersey (4).										
Enterprize Tilly	23131	27.10.35	N.O.C.	7,467	4·38	327·37	350	Mature	301, 434, 470, 398, 512, 446, 446	Royal Gem of Somerville
Somerville Lettie 2nd ..	34112	8.11.35	18½	6,570	5·44	357·18	350	Mature	325 ..	Somerville Reputation
Vaucluse Daphne ..	51012	12.10.35	7½	5,236	6·16	322·68	270	Jr. 3	274 ..	Vaucluse Duke 3rd
Vaucluse Empress 3rd ..	51013	10.11.35	20	5,981	5·62	335·88	250	Sr. 2	318 ..	Somerville Concentration
Fixter, A., Boisdale, Guernsey (1).										
Avonview Golden Daffodil	3966	27.10.35	13½	5,939	5·17	307·33	250	Sr. 2	.. ..	Avonview Golden Lord

* 240 days in test.

STANDARD HERD RECORDS—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Fixter, W. and Son, Boisdale, Jersey (4).										
Olivedale Dianthus 2nd ..	45547	21.11.35	18½	7,356	5·68	417·88	290	Sr. 3	330 ..	Bellefaire Blonde's Blondex
Olivedale Pearl 2nd ..	49943	4.11.35	22½	7,919	5·48	434·33	250	Sr. 2	369 ..	Omatoroa Kingsford Smith
*Olivedale Queenie ..	24352	29.11.35	..	7,143	5·00	357·47	350	Mature	312, 309, 336, 346, 453, 356, 483	Emperor
Studleigh Dianthus 4th ..	25288	1.12.35	18½	8,057	5·19	418·07	350	Mature	303, 311, 424, 420, 456	Werribee Madeira Starbright King
Foster Bros., Boisdale, Jersey (9).										
Ballara Madeira	23145	5.11.35	14½	8,086	4·41	356·83	350	Mature	302, 309, 359, 373, 443, 401	Werribee Madeira Cream's Masterpiece
Boisdale Countess ..	33345	23.10.35	7	7,701	5·57	428·72	350	Mature	214, 375, 404, 427	Starbright's Prince of Glen Iris
†Boisdale Ettie	43049	28.11.35	4	4,065	6·36	258·40	290	Sr. 3	299, 264 ..	Boisdale Spark
Boisdale Fuchsia	43051	22.12.35	15	5,775	6·11	353·12	290	Sr. 3	.. ..	Gladiator of Springhurst
Boisdale Nightshade ..	43054	5.12.35	9½	4,901	5·33	261·07	290	Sr. 3	221, 263 ..	Gladiator of Springhurst
Boisdale Nightshade 2nd ..	47296	20.12.35	18½	6,455	5·45	351·76	250	Sr 2	284 ..	Gladiator of Springhurst
Boisdale Nymph ..	Vol. 23	2.12.35	10½	3,870	5·69	220·33	230	Jr. 2	.. ..	Boisdale Dazzler
Pine Park Lady Choice 2nd	41580	11.12.35	10	5,841	5·18	302·72	350	Mature	341, 318, 383	Goronga Farm Jester
Staghorn Master's Beauty ..	23148	12.12.35	21½	7,097	4·95	351·40	350	Mature	321, 414, 382, 456, 363, 388	Werribee Northern Masterpiece
Fraser, G. A., Addington, Ayrshire (8).										
Bonnie Doon Avis ..	26967	12.11.35	26½	8,696	4·57	397·38	230	Jr. 2	.. ..	Bonnie Doon Marquis
Bonnie Doon Bertha ..	26968	5.12.35	14½	6,368	4·03	256·79	250	Sr. 2	.. ..	Glengowrie Masterpiece
Bonnie Doon Graceful ..	26971	10.10.35	13½	6,434	3·61	232·23	250	Sr. 2	210 ..	Glengowrie Masterpiece
Bonnie Doon Heather ..	22525	8.11.35	30½	11,708	5·34	625·43	350	Mature	378, 557, 611	Carlo of the Valley
Bonnie Doon May ..	26973	4.10.35	16	6,485	4·58	297·12	250	Sr. 2	203 ..	Glengowrie Masterpiece
Bonnie Doon Snowdrop ..	23467	8.10.35	17½	8,603	4·14	355·85	290	Sr. 3	381 ..	Blair Athol Dream Boy
Bonnie Doon Sybil ..	26975	12.10.35	15½	8,210	3·66	300·12	250	Sr. 2	217 ..	Glengowrie Masterpiece
Bonnie Doon Winsome ..	23468	29.11.35	20	6,705	4·22	283·25	310	Jr. 4	289, 299 ..	Blair Athol Dream Boy
Gange, Mrs. E. M., Werribee South, Ayrshire (10).										
Roseleigh Belle	25402	18.12.35	21½	7,325	4·16	304·44	310	Jr. 4	.. ..	Roseleigh Champion
Roseleigh Berna	27707	2.11.35	6	4,725	4·30	203·09	230	Jr. 2	.. ..	Craigmore Lauder
Roseleigh Blonde ..	20692	18.12.35	15	6,285	3·81	239·55	350	Mature	.. ..	Roseleigh Bruce
Roseleigh Dream ..	26714	13.11.35	19	7,691	4·52	347·39	270	Jr. 3	.. ..	Cathcart Marvel
Roseleigh Heath	27712	21.11.35	17	6,351	4·27	271·44	250	Sr. 2	.. ..	Cathcart Marvel
Roseleigh Holly	27713	29.10.35	13	5,284	4·56	241·11	230	Jr. 2	.. ..	Cathcart Marvel
Roseleigh Moonlight ..	24312	28.9.35	4	6,282	4·67	293·39	330	Sr. 4	264 ..	Roseleigh Advance
Roseleigh Precious ..	26717	21.11.35	10½	5,162	4·78	246·70	270	Jr. 3	.. ..	Cathcart Marvel
Roseleigh Rosette ..	24317	1.10.35	5½	8,282	4·42	366·01	350	Mature	283 ..	Roseleigh Advance
Roseleigh Welcome ..	26720	3.12.35	4	4,272	4·52	193·19	270	Jr. 3	.. ..	Cathcart Marvel
Garden, A., Swan Hill, Red Poll (2).										
Ardgour Mary 4th ..	2612AA	2.12.35	10	7,161	4·33	309·76	350	Mature	250, 305 ..	Marshlands Royal Saracen
Glenbrook Coral	4081C	27.10.35	15	8,769	4·35	381·34	290	Sr. 3	206, 213 ..	Glenbrook Cherry Bob
Gardiner Bros., Welshpool, Jersey (6).										
Lauriston Golden Belle ..	34012	16.10.35	9½	7,931	4.59	364.40	350	Mature	241, 348, 351, 479	Lauriston Twylish Nobility
Lauriston Heather Belle ..	44828	8.10.35	11½	5,799	5·05	292·72	250	Sr. 2	311 ..	Rathlyn Lily's Master
Lauriston Island Lady ..	34013	4.11.35	8½	6,836	5·43	371·05	350	Mature	239, 316, 313, 493	Jerseyholm Island King 7th
Lauriston Island Pansy ..	37408	9.10.35	14½	7,608	5·35	406·73	350	Mature	347, 422, 479	Jerseyholm Island King 7th
Lauriston Lotus Lily ..	44830	24.10.35	6	5,619	5·36	301·17	250	Sr. 2	339 ..	Rathlyn Lily's Master
Lauriston Snowshoes Duchess	25893	19.11.35	7½	6,819	4·84	330·29	350	Mature	257, 297, 334, 350, 376, 379	Lauriston Twylish Nobility
Gay, R. G., North Devon, Jersey (3).										
Elm Grove Laura ..	37416	27.11.35	16	6,606	5·84	386·08	330	Sr. 4	283, 338, 380	Gold Star of Melrose
Elm Grove Silvermine ..	39643	8.12.35	20	7,278	5·68	413·71	310	Jr. 4	310, 426 ..	Warenda Ragtime Dominant
Myrtle Point Songstress ..	45341	15.10.35	29½	10,047	4·96	497·98	290	Sr. 3	458 ..	Werribee Master King
Goddard, J. H., Jumbunna, Ayrshire (3).										
Donside Loco Lady ..	23656	14.10.35	4	9,485	4·23	400·87	350	Mature	272, 460 ..	Loco of Lady Bank
‡Donside Thistledown 2nd	23662	4.10.35	4	12,180	4·34	528·69	350	Mature	401 ..	Olive Dale Chum
Inverurie Duchess ..	27414	4.10.35	N.O.C.	8,435	4·72	398·52	270	Jr. 3	401 ..	Oakbank Radio
Goldschmidt, O., Bacchus Marsh, Jersey (11).										
Crystal Brook Aster ..	47797	1.10.35	12	5,082	5·27	267·60	230	Jr. 2	.. ..	Crystal Brook Noble
Crystal Brook Cosma ..	47801	9.10.35	10	4,530	5·83	264·18	230	Jr. 2	.. ..	Crystal Brook Noble
Crystal Brook Dream ..	47803	16.10.35	16½	4,942	5·40	266·88	230	Jr. 2	.. ..	Crystal Brook Noble
Crystal Brook Floss ..	47808	6.12.35	19	6,476	5·35	346·37	270	Jr. 3	.. ..	Twylish of Crystal Brook
Crystal Brook Glow ..	47810	3.10.35	13	5,357	5·46	292·48	230	Jr. 2	.. ..	Crystal Brook Noble
Crystal Brook Honey ..	47813	27.11.35	16	5,229	5·65	295·57	230	Jr. 2	.. ..	Crystal Brook Noble
Crystal Brook Idyll ..	47814	26.10.35	10	4,529	5·86	265·59	230	Jr. 2	.. ..	Crystal Brook Noble
Crystal Brook Lydia ..	47821	6.10.35	19	5,817	4·96	288·31	230	Jr. 2	.. ..	Paisley Game Master
Crystal Brook Mina ..	47822	13.10.35	11	4,686	5·39	252·67	230	Jr. 2	.. ..	Crystal Brook Noble
Grangelea Rose 4th ..	44178	23.10.35	19½	6,167	5·56	342·60	270	Jr. 3	324 ..	Banyule Macon
Grangelea Velveteen ..	36968	4.11.35	16	6,336	5·56	352·01	350	Mature	309, 344, 352	Glenoshea Renegade

* 246 days in test (sold). † 246 days in test. ‡ 240 days in test.

Standard Herd Records—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Gregg, V., Whittlesea, Jersey (1).										
Stoneycroft Una 6th ..	C.R.	10.11.35	15	4,635	5·01	231·99	230	Jr. 2	.. ..	Kantara Don Juan
Handbury, J. E., and Sons, Toora, No. 2 Farm, Jersey (1).										
*Tooravale Milkmaid 13th..	50895	1.10.35	4	3,435	4·94	169·77	270	Jr. 3	322 ..	Kingsvale Monica 14th's Son
Harvey, T., Boisdale, Jersey (8).										
Jerseyholm Bluebell 7th ..	23202	9.12.35	11	6,966	5·04	351·43	350	Mature	310, 347, 338, 434, 415, 389, 379	Handsome Boy 5th of Melrose
Jerseyholm Bluebell 20th ..	Vol. 23	28.9.35	13½	4,673	4·99	233·22	230	Jr. 2	.. ..	Jerseyholm Masters Fox 6th
Jerseyholm Bluebell 21st ..	Vol. 23	4.11.35	13	4,797	5·69	272·84	230	Jr. 2	.. ..	Werribee Masters Fox
Jerseyholm Daisy 16th ..	25395	27.9.35	21	8,711	5·41	471·34	350	Mature	485, 459, 497	Werribee Masters Fox
*Jerseyholm Empress 33rd	40380	10.10.35	4	4,725	5·02	237·42	270	Jr. 3	312 ..	Werribee Masters Fox
Jerseyholm Empress 34th ..	40381	5.10.35	15½	5,262	5·53	290·95	270	Jr. 3	278 ..	Werribee Masters Fox
Jerseyholm Kirsty 23rd ..	25401	12.11.35	14½	6,344	5·70	361·66	350	Mature	277, 371, 387, 421	Lord Island Fancy of Brucevale
Jerseyholm Lady Marge 14th	Vol. 23	28.9.35	13½	4,674	5·84	272·87	230	Jr. 2	.. ..	Werribee Masters Fox
Henderson, W., Grasmere, Ayrshire (6).										
Carracoorte Brownie 25th ..	28169	28.11.35	7½	3,098	4·57	141·65	250	Sr. 2	.. ..	Grand View Bernie
†Carracoorte Brownies Pet 2nd	24682	11.10.35	4	5,813	4·27	248·34	350	Mature	375, 350, 397	Carracoorte Lochiel
Carracoorte Bunty 26th ..	28171	20.11.35	16	3,399	4·55	154·68	230	Jr. 2	.. ..	Carracoorte Bluebell's Favourite
†Carracoorte Filpail 20th ..	24690	9.12.35	4	3,825	4·70	179·61	330	Sr. 4	270, 444 ..	Carracoorte Lochiel
Carracoorte Iris 11th ..	19696	28.11.35	4	7,230	4·00	289·31	350	Mature	250, 324, 403, 337, 498	Bluebell's Pride of Glencourt
Carracoorte Muriel ..	28175	5.10.35	10	4,410	4·20	185·06	230	Jr. 2	.. ..	Carracoorte Boomerang
Herd, L. J., Heidelberg, Jersey (2).										
Banyarra Silvermine ..	42876	4.10.35	17	6,400	5·49	351·32	310	Jr. 4	.. ..	Banyule Lord Silviar
*Banyarra Trinket 4th ..	47117	30.11.35	4	4,883	4·91	239·72	230	Jr. 2	.. ..	Retford King Bracken
Hore, E., Leitchville, Jersey (4).										
Milvue Roseleaf	45181	15.11.35	24½	8,397	5·08	426·33	270	Jr. 3	388 ..	Taranah Commander
Troed-yr-Rhiw Bettwys 2nd	42295	5.11.35	29½	10,673	5·53	590·36	310	Jr. 4	490 ..	Troed-yr-Rhiw Masterpiece
Troed-yr-Rhiw Carlad 2nd..	50927	5.11.35	22	7,896	5·75	453·63	270	Jr. 3	360 ..	Glen Iris Montrose Duke
Troed-yr-Rhiw Tydfyl ..	50932	8.11.35	4	4,982	4·45	221·60	270	Jr. 3	322 ..	Glen Iris Montrose Duke
Hore, M. T., Horfield, Friesian (5).										
Burnbank Laird Tritonia ..	Vol. 13	22.12.35	8	8,096	3·85	311·58	290	Sr. 3	412 ..	Burnbank Majoe Laird
Elmar Eclipse's Pride ..	C.R.	20.12.35	21½	7,880	3·45	271·55	230	Jr. 2	.. ..	Greenvale Oakwood Posch
Elmar Mona	Vol. 13	7.10.35	22½	9,567	3·98	381·09	310	Jr. 4	385 ..	Greenvale Oakwood Posch
Elmar Rosey	Vol. 13	23.10.35	30	8,742	3·40	296·97	230	Jr. 2	.. ..	Greenvale Oakwood Posch
Greenvale Segis Patch ..	3495	10.11.35	22	13,341	3·07	409·00	350	Mature	559, 340, 637	Lydholme Segis Paxton
Houfe, H. V., Tresco, Jersey (2).										
The Wattles Betty ..	33982	19.12.35	11	4,569	5·83	266·17	350	Mature	328, 444, 440, 323	Choice Prince of Belgonia
The Wattles Hazel ..	37345	22.11.35	7	5,531	5·03	278·03	350	Mature	255, 215 ..	Prince of The Wattles
Huffer, J. A., Gormandale, Jersey (3).										
Glen Valley Cream Rose ..	28760	31.10.35	15	7,008	5·59	391·51	350	Mature	317, 397, 442, 399, 409	Cream Lad of Mayland
Glen Valley Golden Belle ..	Vol. 23	24.12.35	18	4,953	5·94	294·35	230	Jr. 2	.. ..	Brucevale Wyandotte's King
Glen Valley Quick Countess	25430	29.10.35	14	8,768	5·37	470·69	350	Mature	392, 593, 508, 434, 427	Waverley's Count of Glen Valley
Hurrey, W. H., Koonwarra, Jersey (6).										
Kooreena Audrey 5th ..	44752	1.10.35	10	4,772	5·69	271·61	270	Jr. 3	229 ..	Columbine's Defiance of Linga Longa
Kooreena Audrey 7th ..	49031	18.11.35	17	5,654	6·06	342·59	230	Jr. 2	.. ..	Kooreena Carrie 3rd's Delegate
Kooreena Audrey 8th ..	49032	8.10.35	11¼	4,205	6·76	284·41	230	Jr. 2	.. ..	Kooreena Carrie 3rd's Delegate
Kooreena Carrie	25949	28.9.35	9	5,762	6·18	355·81	350	Mature	256, 358, 286, 293, 344	Pearl's Butter King of Kirkhill
Kooreena Maranta 11th ..	49036	10.10.35	15	4,965	6·25	310·47	230	Jr. 2	.. ..	Kooreena Carrie 3rd's Halo
Kooreena Yo-Yo	44759	3.10.35	17	6,860	5·68	389·71	270	Jr. 3	360 ..	Columbine's Defiance of Linga Longa
Hutchison, H. McD., Yan Yean, Jersey (1).										
Eulomo Duchess	C.R.	9.12.35	15½	4,697	5·29	248·52	230	Jr. 2	.. ..	Melrose Clementine 2nd's Masterpiece
Knowles, T., Dandenong, Ayrshire (6).										
Beleura Solo 3rd ..	19514	22.10.35	15½	8,562	4·10	351·17	350	Mature	.. ..	Starbright of Beleura
Dandy Beltana	25995	4.11.35	17½	9,885	3·93	388·52	310	Jr. 4	318, 328 ..	Dandy Masterpiece
Dandy Mab	23610	4.10.35	22	9,591	4·42	423·83	350	Mature	400, 485, 461, 520	Glencourt Prince
Dandy Melba	23611	16.11.35	5	9,012	3·85	346·62	350	Mature	348, 419, 395, 492	Dandy Brilliant Boy
Dandy Queenie	28249	26.10.35	20	6,573	4·45	292·62	230	Jr. 2	.. ..	Maesgwyn Prince Alfred
Dandy Rose Queen	26007	15.11.35	12	7,344	4·80	352·62	310	Jr. 4	305, 348 ..	Beleura Pensive

* 240 days in test. † 210 days in test.

STANDARD HERD RECORDS—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Lindsay, G., Pakenham, Jersey (2).										
Unanderra Carman 4th ..	46543	17.12.35	9	4,627	5·07	234·47	310	Jr. 4	204, 252 ..	Meridale Bright Light
Unanderra Success	Vol. 23	17.10.35	11	5,586	4·76	266·14	250	Sr. 2	240 ..	Wompini Irish Lad
Longerenong Agricultural College, Dooen, Ayrshire (2).										
Longerenong Acacia Normalis	26546	19.10.35	11	4,518	3·91	176·77	270	Jr. 3	.. ..	Longerenong Noble
*Longerenong Cootamundra Wattle	26552	10.10.35	4	5,235	4·38	229·05	270	Jr. 3	244 ..	Longerenong Baron
Lowing, Mrs. L., Narre Warren, Jersey (1).										
Troed-yr-Rhiw Mair ..	50930	18.10.35	..	5,126	5·28	270·78	270	Jr. 3	.. ..	Glen Iris Montrose Duke
Lyon, C. G., Heidelberg, Jersey (18).										
Banyule Dea	42881	3.10.35	15½	5,403	6·02	325·13	230	Jr. 2	.. ..	Oxford Beau's Pretty Oxford (Imp.)
Banyule Ettie 14th ..	34186	9.11.35	20½	7,142	4·91	350·46	350	Mature	327, 341 ..	Superstrain of Banyule
Banyule Ettie 18th ..	38796	10.10.35	16½	6,249	6·45	402·98	270	Jr. 3	.. ..	Banyule Triplane
Banyule Gipsy 2nd ..	42883	8.10.35	14½	5,526	5·02	277·33	230	Jr. 2	.. ..	Banyule Supreme
Banyule Lady Lotus ..	25461	1.11.35	18½	7,875	5·55	436·90	350	Mature	323, 426, 484	Air Lord of Banyule
Banyule Molly 25th ..	24458	25.11.35	22½	7,520	4·54	342·04	350	Mature	375, 443, 406, 355, 478	Wotton Airman (Imp.)
Banyule Molly 44th ..	38800	6.11.35	24½	7,736	5·07	392·45	270	Jr. 3	366 ..	Banyule Triplane
Banyule Molly 45th ..	42885	23.11.35	19	6,266	4·98	312·19	230	Jr. 2	.. ..	Banyule Supreme
Banyule Molly 46th ..	42886	17.10.35	19½	6,449	5·50	354·52	230	Jr. 2	.. ..	Banyule Airo
Banyule Pretty Lotus ..	37777	28.11.35	16	5,943	4·88	290·35	310	Jr. 4	231 ..	Banyule Airo
Banyule Silvermine 64th ..	28845	22.10.35	18½	6,926	6·31	437·34	350	Mature	476, 465, 557	Air Lord of Banyule
Banyule Silvermine 75th ..	37779	1.11.35	24	7,409	5·14	380·70	330	Sr. 4	300, 390 ..	Superstrain of Banyule
Banyule Tiddlewinks 9th ..	34198	23.10.35	21½	8,816	5·08	447·80	330	Sr. 4	314, 472 ..	Concentration of Banyule
Banyule Tiddlewinks 13th	38808	11.12.35	19½	7,073	5·92	418·69	270	Jr. 3	450 ..	Banyule Triplane
Banyule Tiddlewinks 16th	42895	17.11.35	19½	5,682	5·44	309·24	230	Jr. 2	.. ..	Oxford Beau's Pretty Oxford (Imp.)
Banyule Tiddlewinks 17th	42896	30.11.35	18	5,471	5·14	281·48	230	Jr. 2	.. ..	Oxford Beau's Pretty Oxford (Imp.)
Berrington Velveteen ..	Vol. 23	2.12.35	19	5,546	4·82	267·32	230	Jr. 2	.. ..	Oxford Beau's Pretty Oxford (Imp.)
Gowanlea Oxford's Gipsy ..	37788	28.10.35	19½	7,772	5·34	415·01	350	Mature	324, 387, 488	Oxford Beau's Pretty Oxford (Imp.)
Lyon, W. H., Sale, Jersey (6).										
Avon Daphne 8th ..	47068	25.10.35	16½	7,239	5·48	396·65	270	Jr. 3	305 ..	Avon Lassie Fowler's Count
Avon Lassie Fowler 10th ..	47071	4.10.35	11½	5,905	5·52	325·88	290	Sr. 3	306 ..	Jessie 13th's Count of Melrose
Avon Little Nell 3rd ..	33458	23.11.35	10½	6,863	5·68	389·95	350	Mature	382, 367 ..	Jessie 13th's Count of Melrose
Avon Rose 4th	47074	19.10.35	17½	8,310	5·09	423·02	310	Jr. 4	300, 339 ..	Jessie 13ths' Count of Melrose
Olivedale Buttercup ..	37381	17.10.35	10½	6,080	5·79	352·06	350	Mature	395, 366, 348, 370	Studleigh Dandy
Studleigh Harebell 16th ..	50708	29.10.35	9½	5,597	5·24	293·55	270	Jr. 3	259 ..	Bellefaire Blonde's Blondex
Macauley, C. W., Rochester, Jersey (3).										
Taranah Chime	Vol. 23	11.10.35	17½	8,339	5·81	483·13	290	Sr. 3	303, 402 ..	Duke of Invermay
Taranah Floss	37857	13.10.35	16½	8,186	5·85	478·85	350	Mature	313, 399, 455, 530	Duke of Invermay
Taranah Rainbow ..	42118	3.10.35	18½	8,507	5·72	486·63	330	Sr. 4	343, 433, 425	Duke of Invermay
McCosh, S. J., Wandin North, Jersey (1).										
Heathermont Brilliant Promise	48638	12.12.35	15	4,331	5·40	234·01	230	Jr. 2	.. ..	Staghorn Promise's Masterpiece
McDougall, J., Byaduk, Jersey (12).										
Park View Audrey ..	41511	1.11.35	9	6,284	4·72	296·61	330	Sr. 4	288, 352 ..	Prince of Park View
Park View Blossom 2nd ..	50080	28.10.35	12½	5,046	5·14	259·13	230	Jr. 2	.. ..	Staghorn Fancy's Observer 2nd
Park View Bluebell ..	50081	20.11.35	17	5,045	5·24	264·53	230	Jr. 2	.. ..	Staghorn Fancy's Observer 2nd
Park View Fair Lady ..	50083	2.11.35	13½	5,531	4·98	275·26	230	Jr. 2	.. ..	Staghorn Fancy's Observer 2nd
Parkview Floss	50084	13.10.35	11	5,478	5·51	302·11	230	Jr. 2	.. ..	Staghorn Fancy's Observer 2nd
Park View Heather 2nd ..	45648	23.10.35	12½	5,601	5·39	301·69	270	Jr. 3	342 ..	Grangelea Royal
Park View Larkspur ..	50086	11.10.35	11½	4,910	5·65	277·33	230	Jr. 2	.. ..	Staghorn Fancy's Observer 2nd
Park View Myrtle 2nd ..	45650	12.11.35	15	5,534	5·03	278·46	270	Jr. 3	293 ..	Grangelea Royal
Park View Nellie ..	41518	5.11.35	14	5,771	5·28	304·63	330	Sr. 4	344, 348 ..	Grangelea Royal
Park View Nola 2nd ..	45651	10.10.35	9½	4,724	5·60	264·48	270	Jr. 3	259 ..	Grangelea Royal
Park View Novelty 2nd ..	45652	19.10.35	14	6,086	4·96	301·85	270	Jr. 3	278 ..	Grangelea Royal
Park View Peggy 2nd ..	50087	9.10.35	11	4,361	5·47	238·61	230	Jr. 2	.. ..	Staghorn Fancy's Observer 2nd

* 240 days in test.

Standard Herd Records—*continued.*

Name of Cow.	Herd Book No	Date of Calving.	Milk last day of Test. lb.	Milk lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
McInnes, A. A., Gunbower, Dairy Shorthorn (4).										
*Loch Ness Janie ..	D.S.H.B.A.	8.10.35	4	4,005	3·73	149·55	230	Jr. 2	.. ..	Willow Park Banker 7th
*Loch Ness Pearl Beauty 5th	D.S.H.B.A.	29.9.35	4	5,985	3·69	220·62	310	Jr. 4	135, 254 ..	Braeland's Matilda Duke
Loch Ness Pearl Beauty 6th	D.S.H.B.A.	16.10.35	4½	4,137	3·66	151·41	290	Sr. 3	118 ..	Braeland's Matilda Duke
*Loch Ness Pearl Beauty 7th	D.S.H.B.A.	24.10.35	4	4,920	3·94	194·07	270	Jr. 3	186 ..	Braeland's Matilda Duke
Maher, R. H., Tongala, Jersey (9).										
Banyule Silvermine 39th ..	18818	5.11.35	6	6,123	4·78	292·53	350	Mature	429, 380, 444, 372, 361, 421	Noble Airman of Banyule
Rosemont Daisy 4th ..	26063	26.11.35	6	4,608	5·92	272·60	350	Mature	356, 406, 442, 488, 430, 318, 377	Rosella 2nd's Noble of Rosemont
Rosemont Jenny Lind 7th	37875	27.9.35	5½	7,043	5·43	382·17	350	Mature	340, 338, 394, 438	Rosella 2nd's Noble of Rosemont
Rosemont Jenny Lind 9th	50456	5.10.35	8	5,024	6·14	308·56	290	Sr. 3	343 ..	Rosemont Laddie Fowler 3rd
*Rosemont Jessie 7th ..	41863	28.9.35	4	4,155	5·62	233·58	350	Mature	238, 238, 341	Rosella 2nd's Noble of Rosemont
Rosemont Lady Fowler 9th	50459	10.10.35	10	4,679	5·10	238·72	250	Sr. 2	254 ..	Duke of the Lake (Imp.)
Rosemont Primrose 3rd ..	37879	15.10.35	11	6,936	4·92	341·46	350	Mature	339, 191, 160, 357	Lassie's Duke of Eurangee
Rosemont Silvermine ..	37880	14.10.35	8	5,931	5·40	320·23	350	Mature	258, 260, 270, 334	Rosella 2nd's Noble of Rosemont
Rosemont Silvermine 3rd ..	50462	14.10.35	6	3,995	6·08	242·90	270	Jr. 3	208 ..	Rosemont Laddie Fowler 3rd
Mailer, Dr. R., Shepparton, Jersey (6).										
Kantara Jessie	48940	5.10.35	12½	6,511	5·17	336·90	310	Jr. 4	.. ..	Ku Ku Fashion Plate (Imp.)
Maneroo Golden Dawn ..	C.R.	28.9.35	9½	5,729	4·81	275·58	230	Jr. 2	.. ..	Wompini Royal Duke
Maneroo Marguerite 2nd ..	Vol. 23	1.10.35	7	5,138	4·93	253·11	230	Jr. 2	.. ..	Kantara Handsome Boy
Maneroo Queenie ..	C.R.	1.10.35	6½	4,554	5·16	234·87	230	Jr. 2	.. ..	Maneroo Daphne's Twylish Lad
Maneroo Sunlight ..	40881	4.10.35	7	5,556	5·93	329·56	310	Jr. 4	401 ..	Maneroo Daphne's Twylish Lad
Maneroo Winifred ..	C.R.	18.10.35	8	5,019	5·07	254·22	230	Jr. 2	.. ..	Wompini Royal Duke
Maloney, P. J., Tongala, Jersey (4).										
Belgonia Design's Marie ..	42919	6.12.35	20½	8,548	5·46	467·06	270	Jr. 3	377 ..	Design's Ruler (Imp.)
Belgonia Design's Perree ..	42920	9.10.35	17	8,285	5·29	438·30	270	Jr. 3	387 ..	Design's Ruler (Imp.)
Belgonia Junette 2nd ..	47152	12.11.35	11	6,132	5·70	349·68	230	Jr. 2	.. ..	Duke of The Lake (Imp.)
Gem's Noella (Imp.) ..	33497	11·11.35	29	12,173	4·33	526·51	350	Mature	576, 629, 572	Hamlet's You'll Do
Meaklim Bros., Mooroopna, Dairy Shorthorn (3).										
Drumneil Duchess 3rd ..	D.S.H.B.A.	1.10.35	19	11,603	3·66	424·93	350	Mature	374 ..	Bounty of Darbalara
Drumneil Queenie ..	D.S.H.B.A.	4.10.35	25½	10,728	3·96	424·41	350	Mature	425 ..	Willow Park Rosemont
Drumneil Roany 2nd ..	D.S.H.B.A.	29.9.35	18	8,729	4·23	369·57	290	Sr. 3	.. ..	Willow Park Reformer
Mitchell, R. H., Linton, Jersey (3).										
Brucevale King Lark's Satisfaction	37947	11.11.35	16	6,116	6·24	381·48	330	Sr. 4	336, 389 ..	Werribee Wyandotte's King
Clifford Farm Lady Sarah ..	34264	26.10.35	14½	8,235	5·83	480·48	350	Mature	483, 529, 499	Clifford Farm Eliminator
Clifford Farm Misty Maiden	Vol. 23	14.12.35	12½	5,123	5·83	298·61	230	Jr. 2	.. ..	Clifford Farm Chieftain
Moore, J. and Co., Yarram, Jersey (3).										
Tooloonook Heather 4th ..	C.R.	1.11.35	11	5,105	4·71	240·26	230	Jr. 2	.. ..	Tooloonook Plumbago's Hero
Tooloonook Plumbago 2nd ..	25568	17.10.35	10	6,675	4·93	329·38	350	Mature	323, 427, 463, 349, 393 375	Heroic of Somerville
Tooloonook Trixie 13th ..	46473	19.10.35	8	4,829	5·04	243·47	310	Jr. 4	260, 310 ..	Tooloonook Plumbago's Hero 2nd
Nancarrow Bros., Kerang, Jersey (8).										
Aveley Norma	22953	12.10.35	18½	8,072	5·22	421·46	350	Mature	295, 418, 422, 417, 407	Werribee Fancy's Butter King
Ballara Beauty 2nd ..	29537	6.10.35	15	6,761	5·87	397·16	350	Mature	299, 388, 388, 393, 493	Werribee Madeira's Cream's Masterpiece
Bellaire Starette 5th ..	38835	4.11.35	15½	8,807	4·92	433·32	350	Mature	437, 450, 452	Bellaire Noble 2nd
Pine Ridge Duchess ..	37972	25.10.35	20	8,375	5·41	452·67	350	Mature	404, 450 ..	Werribee Fancy Clementine's King
Pine Ridge Princess ..	33558	11.11.35	13	5,032	5·68	285·98	350	Mature	371, 355, 383	Bellaire Count
Pine Ridge Silvermine ..	Vol. 23	4.12.35	14½	5,238	5·93	310·83	230	Jr. 2	.. ..	Oxford Beau's Pretty Oxford (Imp.)
†Pine Ridge Starette ..	Vol. 23	16.11.35	4	3,345	5·19	173·64	230	Jr. 2	.. ..	Beverley Highflier
Pine Ridge Wattle ..	Vol. 23	8.11.35	11½	4,937	4·69	231·66	230	Jr. 2	.. ..	Pat of Belgonia

* 240 days in test. † 150 days in test.

STANDARD HERD RECORDS—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Nicholas, A. M., Sherbrooke, Jersey (5).										
Jubilee Rowan	38128	8.10.35	9½	8,187	4·72	386·47	350	Mature	308, 405, 372	Jubilee Whatlight
Jubilee Waterlily ..	33796	27.12.35	6	6,011	5·70	342·75	350	Mature	270, 319, 369, 396	Jubilee Whatlight
Selsey Design's Clementine	46120	21.11.35	14½	6,315	6·43	405·89	270	Jr. 3	365 ..	Design's Ruler (Imp.)
Selsey Lady Viola ..	41946	24.10.35	9	6,475	5·66	366·80	310	Jr. 4	341, 389 ..	Jubilee Asterlight
Selsey Rose	41947	5.10.35	16½	7,899	5·33	421·24	310	Jr. 4	381, 492 ..	Jubilee Asterlight
Nilsson, P. O., Tynong, Jersey (2).										
Glen Iris Nasturtium ..	18790	3.10.35	21½	7,790	4·88	380·48	350	Mature	331, 234, 334, 387	Mercedes Sweet Duke of Glen Iris
Grasmere May Leonie ..	37676	26.10.35	15	6,585	4·92	323·66	350	Mature	388, 361 ..	Werribee Masterman
Noble, T. M. and Sons, Maffra, Jersey (6).										
Finchley Canary 3rd	37992	30.11.35	20½	9,180	5·98	548·66	350	Mature	354, 565, 509, 635	Werribee Lord Burnham
Finchley Handsome Girl ..	39740	6.10.35	15½	6,756	6·66	449·70	310	Jr. 4	413 ..	Werribee Lord Burnham
Finchley Lady Burnham ..	48129	1.10.35	12	4,853	6·75	327·72	230	Jr. 2	.. ..	Werribee Lord Burnham
Finchley Lady Patch ..	48130	9.11.35	15	7,878	5·18	407·82	310	Jr. 4	360, 425 ..	Werribee Lord Burnham
Finchley Nasturtium ..	39743	19.12.35	17	6,321	5·77	364·52	350	Mature	379 ..	Werribee Lord Burnham
Finchley Nasturtium 2nd ..	C.R.	23.11.35	19½	6,965	5·79	402·97	250	Sr. 2	361 ..	Werribee Lord Burnham
O'Neill, J., Echuca Village, Jersey (5).										
Ballara Bluebell 4th ..	38007	11.11.35	12½	7,166	6·02	431·36	350	Mature	419, 517, 519	Brucevale Lord Fancy Madeira
Ballara Model 6th ..	33837	14.10.35	9½	7,908	5·57	440·27	350	Mature	380, 446, 507	Brucevale Lord Fancy Madeira
*Fourshell's Heroine 2nd ..	38346	4.11.35	4	5,700	5·55	316·26	350	Mature	352, 333, 330	Belgonia Propeller
Strathbow Heather Belle ..	29326	21.10.35	5½	6,191	6·43	399·08	350	Mature	362, 508, 546, 469	Studleigh Noble
Ullina Bluebell	Vol. 23	2.12.35	13½	6,413	5·34	342·31	230	Jr. 2	.. ..	Ballara Fancy's King
Overend, Mrs. A. C., Sale, Jersey (7).										
Bon Accord Belle 2nd ..	38948	2.12.35	15½	5,043	5·06	255·30	330	Sr. 4	173, 239, 309	Bon Accord John
Bon Accord Bertha's Spark	43055	27.10.35	11½	4,796	5·12	245·51	310	Jr. 4	264, 377 ..	Bon Accord John
Bon Accord First Spark ..	C.R.	19.12.35	13½	3,597	5·55	199·52	230	Jr. 2	.. ..	Tavistock Mystic Prince
Bon Accord Mascotte 2nd ..	38011	25.12.35	19½	4,924	5·96	293·83	350	Mature	290, 305, 268, 307	Bon Accord David
Bon Accord Meg	C.R.	20.10.35	12½	5,300	5·14	272·25	310	Jr. 4	165, 334 ..	Bon Accord John
Bon Accord Mystic Emma ..	C.R.	12.12.35	17½	3,917	5·53	216·55	230	Jr. 2	.. ..	Tavistock Mystic Prince
Bon Accord Princess Carman 2nd	47302	15.11.35	7	4,666	5·55	258·84	270	Jr. 3	347 ..	Bon Accord John
Paddle, H. R., Hallam, Jersey (1).										
Gwanyilla Marigold's Successor	C.R.	13.10.35	12½	4,523	4·27	193·15	310	Jr. 4	.. ..	Werribee Royal Master 2nd
Pattison, F., Tongala, Ayrshire (2).										
Willow Park May ..	16927	2.12.35	8	8,032	3·33	268·97	350	Mature	305, 277, 352, 323, 279	Tonga Park James
Willow Park Rosie ..	23344	13.10.35	15	10,332	3·62	374·05	350	Mature	248, 308, 349	Willow Park Prince
Payne, A. E. T., Lilydale, Guernsey (6).										
Nundorah May Fly ..	3576	20.12.35	11½	4,976	4·51	224·26	310	Jr. 4	.. ..	Nundorah Climax
Yarraview Cinea	5164	6.11.35	18	4,899	5·24	256·80	230	Jr. 2	.. ..	Yarraview Contralto
Yarraview Frisk	5170	14.10.35	12½	5,108	4·22	215·62	230	Jr. 2	.. ..	Camelia's Majestic of Maple Lodge (Imp.)
Yarraview Jennie ..	5172	30.9.35	16	7,490	5·37	401·93	250	Sr. 2	.. ..	Camelia's Majestic of Maple Lodge (Imp.)
Yarraview Souvenir ..	3568	7.10.35	25	11,344	4·56	517·05	270	Jr. 3	.. ..	Camelia's Majestic of Maple Lodge (Imp.)
Yarraview Tulip	3570	11.11.35	16½	8,291	4·46	369·64	310	Jr. 4	.. ..	Camelia's Majestic of Maple Lodge (Imp.)
Pearson, J., Nerrena East, Jersey (1).										
*Warrawee Peerless 2nd ..	C.R.	14.11.35	4	4,673	4·88	228·14	230	Jr. 2	.. ..	Banyule Tympani
Phillips, J. H., Speewa, Jersey (1).										
Peri Vanilla 7th	Vol. 23	24.11.35	23½	7,058	4·81	339·24	270	Jr. 3	.. ..	Leahurst Royal Rover
Pollard, C. F., Bonegilla, Jersey (1).										
†Bonegilla Jonquil ..	38053	7.11.35	4	3,930	5·47	214·89	330	Sr. 4	321, 386 ..	Springhurst Byron
Poyner, N. R., Lilydale, Jersey (5).										
Kyora Jessie 2nd ..	26197	19.11.35	9	5,099	5·62	286·65	350	Mature	299, 374, 320, 419, 486, 393, 362	Foch of Jerarra
Lilydale Cream Bell ..	49202	8.11.35	5½	5,730	5·75	329·74	350	Mature	238, 304 ..	Lilydale Dauntless
Lilydale Harmony ..	44905	13.10.35	7½	5,419	5·71	309·51	330	Sr. 4	249, 301, 306	Lilydale Dauntless
Lilydale Jessie	40725	5.10.35	14½	6,845	4·92	336·47	350	Mature	262, 320 ..	Lilydale Warrior
Strathkellar Betts-y-Coed 3rd	C.R.	20.10.35	11½	4,830	5·50	265·42	230	Jr. 2	.. ..	Woodside Reprieve's Volunteer

* 240 days in test. † 210 days in test.

Standard Herd Records—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Pullar, P. G., Tatura, Friesian (1).										
*Road's End Nora ..	4235	28.10.35	..	10,425	3·45	359·73	350	Mature	385, 409 ..	Netherland King Sylvia 2nd
Raggatt, F., Tongala, Jersey (2).										
Strathbow Goldie 5th ..	26155	24.10.35	22	9,051	6·82	617·16	350	Mature	415, 458, 549, 498, 565	Studleigh Noble
Strathbow Heather Belle 2nd	34294	10.10.35	6½	11,036	4·67	515·45	350	Mature	375, 401, 433, 423	Banyule Fuselage
Raleigh, Miss H. E., Pakenham Upper, Jersey (4).										
Mornmoot Model ..	33137	15.12.35	10	4,112	5·85	240·36	350	Mature	394, 441, 451, 368	Choirmaster of Banyule
Bellefaire Postmaster's Bijouette	35256	6.11.35	12	5,555	5·55	308·44	350	Mature	326, 384 ..	Napoleonette's Postmaster of Rosel (Imp.)
Goronga Farm Airfodil ..	48491	30.10.35	12½	5,936	5·03	298·43	290	Sr. 3	302 ..	Banyule Air Gun
Goronga Farm Gipsy Moth	38095	21.11.35	14	6,327	5·74	363·38	350	Mature	435, 502, 426	Banyule Triplane
Read, J. D., Springhurst, Jersey (2).										
Springhurst Sybil Lily ..	41998	3.10.35	17½	9,018	5·64	508·95	310	Jr. 4	432, 551 ..	Bellefaire Seaborn Successor
Springhurst Tomato 3rd ..	38110	29.9.35	19½	9,120	5·92	539·98	350	Mature	450, 537, 565	Starbright's Prince of Glen Iris
Rechenberg, J. F., Marshall, Ayrshire (1).										
*Camelot Marie	C.R.	19.10.35	..	6,930	3·93	272·43	270	Jr. 3	289 ..	Gowrie Park Squire
Richardson, W. S., Bacchus Marsh, Jersey (11).										
Five Gums Primula 5th ..	34116	8.12.35	16	7,381	5·60	413·62	350	Mature	343, 422 ..	Pearl's Lad of Coolwoola
Five Gums Primula 7th ..	48137	8.12.35	14	5,367	5·69	305·32	250	Sr. 2	.. ..	Staghorn Clementine's Masterpiece
Sutton Lea Airflier ..	38134	22.11.35	18	6,501	6·37	414·21	350	Mature	342, 453, 410	Banyule Petalon 2nd
Sutton Lea Letty ..	Vol. 23	18.11.35	13	4,080	6·12	249·58	230	Jr. 2	.. ..	Banyule Petalon 2nd
Sutton Lea Lu Lu ..	Vol. 23	16.10.35	13	4,661	4·98	232·13	230	Jr. 2	.. ..	Sutton Lea Garnap
Sutton Lea Madge ..	Vol. 23	16.10.35	10½	4,065	5·61	228·04	230	Jr. 2	.. ..	Banyule Patelon 2nd
Sutton Lea Marie ..	Vol. 23	7.10.35	9½	4,259	5·47	233·17	230	Jr. 2	.. ..	Sutton Lea Garnap
Sutton Lea Midge ..	29350	15.10.35	8½	5,940	4·70	279·28	350	Mature	179, 329, 317, 334, 312	Sutton Lea Impulse
Sutton Lea Pariel 3rd ..	50726	7.10.35	11	4,841	6·52	315·45	270	Jr. 3	.. ..	Sutton Lea Garnap
Sutton Lea Patricia ..	26438	6.10.35	11½	6,320	5·55	350·70	350	Mature	285, 250, 313, 457, 427	Lady Lottie's Prince of Belgonia
Sutton Lea Petal ..	46286	16.11.35	15	4,341	6·28	272·42	290	Sr. 3	261 ..	Banyule Petalon 2nd
Ronalds, O., Tarago, Jersey (2).										
Jindivick Babeen ..	Vol. 23	16.10.35	16	8,360	5·46	456·52	250	Sr. 2	.. ..	Somerville Master Babs
Jindivick Heroine 7th ..	Vol. 23	28.10.35	15	6,860	5·71	391·52	230	Jr. 2	.. ..	Somerville Master Babs
Salesian College, Sunbury, Ayrshire (2).										
†Mount Noorat Scottish Lassie 2nd	26595	29.10.35	4	5,175	3·62	187·11	330	Sr. 4	283, 324 ..	Scottish Hero of Gowrie Park
Rupertswood Iris ..	C.R.	1.10.35	19½	6,087	3·70	225·44	270	Jr. 3	.. ..	Rupertswood Leander
Salesian College, Sunbury, Friesian (4).										
Braemore Betty's Triumph	Vol. 13	13.10.35	22½	6,378	3·52	224·31	230	Jr. 2	.. ..	Braemore Sylvia Triumph
Glenloth Korndyke Wynette	Vol. 13	15.12.35	21½	5,817	3·01	175·14	290	Sr. 3	.. ..	Road's End Cato
Glenloth Wild Rose ..	4005	26.11.35	24	9,351	3·04	284·12	350	Mature	.. ..	Road's End Cato
Rupertswood Inka Josie ..	9424	11.10.35	22	7,197	3·75	269·85	230	Jr. 2	.. ..	Cordyline Cremona
Schlipalius, A., Kilmany, Jersey (5).										
de Lecq Briar	33730	28.9.35	7	5,475	5·21	285·09	350	Mature	260, 314, 316, 272	Werribee Starbright Northwood
de Lecq Josephine ..	33731	20.11.35	18½	5,321	4·43	235·96	350	Mature	269, 312, 263, 283	Werribee Starbright Northwood
de Lecq Marigold 2nd ..	33733	4.10.35	8	3,719	6·20	230·64	350	Mature	266, 262, 304, 307	Werribee Starbright Northwood
†Fairbank Flower 2nd ..	48097	13.10.35	4	2,430	6·58	159·84	230	Jr. 2	.. ..	Wompini Beau Brummel
Fairbank Maid	39701	9.10.35	10	4,629	5·92	274·06	270	Jr. 3	283 ..	Wompini Beau Brummel
Sebire, T., Wandin Yallock, Jersey (3).										
Wandin Cream Piece ..	46592	18·10·35	10	5,018	5·30	265·93	270	Jr. 3	.. ..	St. Alban's Lilac's Supervisor
Wandin Daphne	Vol. 23	1.11.35	N.O.C.	4,406	5·30	233·58	230	Jr. 2	.. ..	St. Alban's Lilac's Supervisor
Wandin Madeira's Queen ..	Vol. 23	12.12.35	10½	4,979	4·90	243·80	230	Jr. 2	.. ..	Leven Brae Kingdom
Smith Bros., Mirboo North, Jersey (18).										
Duchess 4th of Goulburn ..	11711	7.10.35	11	6,665	5·21	347·25	350	Mature	517, 490 ..	Rufus of Melrose
Sylvan Hill Alma ..	23444	26.11.35	15	7,200	4·49	322·96	350	Mature	508, 521, 415	Butterwinks 2nd of Jersey Hill
Sylvan Hill Beauty ..	38277	13.10.35	6½	6,326	5·67	358·61	350	Mature	435, 375, 405	Somerville Heir Apparent
Sylvan Hill Bluebell ..	50735	2.10.35	13	6,099	5·26	320·51	270	Jr. 3	345 ..	Somerville Heir Apparent
Sylvan Hill Bright Tissue ..	23445	12.10.35	9½	7,145	4·52	322·64	350	Mature	453, 392, 444	Butterwinks 2nd of Jersey Hill
Sylvan Hill Charm ..	46300	23.10.35	11	7,049	4·92	346·90	310	Jr. 4	286, 426 ..	Somerville Heir Apparent
Sylvan Hill Charmain ..	Vol. 23	4.10.35	6½	3,821	6·08	232·16	230	Jr. 2	.. ..	Handsome Boy 3rd of Jerseyholm

* 240 days in test (herd withdrawn). † 240 days in test.

STANDARD HERD RECORDS—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Smith Bros., Mirboo North—*continued.*										
Sylvan Hill Daisy 2nd ..	26361	4.10.35	8	5,881	5·44	320·01	350	Mature	366, 380, 377	Merrylad of Sylvan Hill
Sylvan Hill Dream Girl ..	28279	8.10.35	9½	6,663	4·56	303·98	350	Mature	332, 274, 316	Sylvan Hill Starbright's Pride
Sylvan Hill Empire Queen..	50737	10.10.35	8½	5,730	5·33	305·67	270	Jr. 3	311 ..	Somerville Heir Apparent
Sylvan Hill Empress ..	33761	29.10.35	15	7,086	5·29	374·86	350	Mature	574, 510, 510	Handsome Boy 3rd of Jerseyholm
Sylvan Hill Handsome Girl	33762	2.10.35	11½	6,465	5·89	380·83	350	Mature	419, 360, 429	Handsome Boy of 3rd Jerseyholm
Sylvan Hill Lady Alma ..	38282	27.9.35	10	7,134	5·33	380·02	350	Mature	363, 364, 409	Somerville Heir Apparent
*Sylvan Hill Noble Lady ..	38283	7.10.35	4	5,385	5·66	304·77	350	Mature	304, 304, 325	Somerville Heir Apparent
Sylvan Hill Alma Belle ..	42089	24.10.35	8½	6,231	5·28	328·86	350	Mature	279, 349, 400	Somerville Heir Apparent
Sylvan Hill Rock Lily ..	46304	2.11.35	8	5,373	6·53	350·54	310	Jr. 4	264, 377 ..	Somerville Heir Apparent
Sylvan Hill Thelma ..	46308	10.10.35	14½	6,990	4·72	330·06	290	Sr. 3	268, 371 ..	Somerville Heir Apparent
Sylvan Hill Vanity ..	50740	2.12.35	18	6,176	5·00	308·87	270	Jr. 3	321 ..	Somerville Heir Apparent
Smith, E. L. and Sons, Woodend, Friesian (3).										
Darenth Black Rose ..	2727	21.10.35	15	12,284	3·27	401·35	350	Mature	345, 468, 584, 554, 710, 764	Springfield Champion
Homeleigh Countess Posch..	4076	6.11.35	5	11,018	3·02	333·08	310	Jr. 4	274, 279 ..	Homeleigh Blackwood
Homeleigh Operetta ..	2798	13.11.35	7½	8,876	3·26	289·55	350	Mature	272, 347, 370, 325, 375	Prince Fobes
Smith, G. and W., Fish Creek, Jersey (3).										
Rydon Bright Eyes ..	29488	13.10.35	19	8,925	5·23	466·86	350	Mature	334, 472, 422, 446	Burnside Monitor
Rydon Mona	33765	4.10.35	17	7,839	6·18	484·10	350	Mature	372, 431, 483	Burnside Monitor
Rydon Onyx 2nd ..	41927	24.12.35	13	6,365	5·47	348·4	310	Jr. 4	306 ..	Melrose Migrant
Stephens, Dr. F. G., Vermont, Guernsey (2).										
Bangalam Vale Fairy ..	3975	27.12.35	23	7,250	4·90	355·51	290	Sr. 3	332 ..	Minnamurra Sequel Slogan
Vermont Una's Princess ..	5188	11.11.35	14	6,861	4·94	338·61	230	Jr. 2	.. ..	Camelia's Majestic 2nd of Maple Lodge (Imp.)
Stirling, H. V., Meade, Jersey (2).										
Banyule Rose	Vol. 23	20.12.35	18½	5,183	5·75	297·81	230	Jr. 2	.. ..	Rintoul View Fancy's Twylish
Banyule Silvermine 46th ..	24466	15.11.35	18½	8,291	4·93	408·42	350	Mature	390, 402, 462, 389	Wotton Airman (Imp.)
Stoll, Mrs. L. T., Rokeby, Jersey (3).										
†Clover Bank Camelia 3rd ..	C.R.	17.10.35	4	2,430	5·19	126·18	230	Jr. 2	.. ..	Clover Bank Lord Twylish
Clover Bank Camelia's Joy..	38363	28.9.35	11	6,590	5·92	389·87	350	Mature	330, 441, 340, 467	Brilliant Dawn of Linga Longa
‡Clover Bank Gwen 6th ..	C.R.	17.11.35	4	2,453	5·51	135·19	230	Jr. 2	.. ..	Clover Bank Lord Twylish
Stoney, W. B., Drouin West, Jersey (3).										
Melview Jenny Lind ..	29393	25.11.35	14	5,332	5·94	316·52	350	Mature	284, 262, 283, 371	Sunburst of Melrose
Tarago Foxglove 3rd ..	50770	25.11.35	12½	4,400	4·78	210·38	230	Jr. 2	208 ..	Glenesk Eminent's Lightnin 2nd
Tarago Gem 4th	Vol. 23	16.10.35	10	3,815	4·81	183·68	230	Jr. 2	.. ..	Glenesk Eminent's Lightnin 2nd
Taylor, C. G., Highton, Jersey (1).										
Leura Patricia 12th ..	40691	10.11.35	6	6,291	4·75	298·91	310	Jr. 4	348 ..	Curiosity's King of Comely Banks
Teague, L. L., Riddell, Guernsey (1).										
Melbourne Golden Sylvia ..	4550	30.9.35	12	4,929	4·92	242·52	250	Sr. 2	231 ..	Melbourne Rob Roy
Thomas and Taylor, Hamilton, Ayrshire (1).										
§Carracoorte Brownell's Beauty	24683	20.12.35	4	4,426	5·08	224·73	350	Mature	272, 283 ..	Carracoorte Maiden's Laddie
Tomasetti, B. G., Drouin West, Ayrshire (4).										
Glen Athol Dairy Lass ..	13646	12.10.35	17	8,879	3·66	324·53	350	Mature	.. ..	Renown of Gowrie Park
Glencorren Venus ..	26202	26.12.35	27	7,289	4·27	311·02	310	Jr. 4	254, 356 ..	Scotswood Michael 2nd
Glencorren Viola	21508	6.10.35	19	9,226	4·76	439·48	350	Mature	281, 390, 456, 511	Scotswood Michael 2nd
Leithvale Phyllis ..	23086	7.10.35	18	7,947	4·90	389·76	350	Mature	234, 359, 368, 412	Gleneira Grantham
Trewin, J. V., Nathalia, Jersey (2).										
Weir View Blossom's Nathalie ..	33839	25.11.35	14	5,745	5·73	329·12	350	Mature	.. ..	Belgonia Stumpy's Twylish
Weir View Greetings 2nd ..	51163	7.11.35	15½	4,952	4·81	238·31	230	Jr. 2	.. ..	Belgonia Milk Lad

* 240 days in test. † 150 days in test. ‡ 180 days in test. § 210 days in test.

STANDARD HERD RECORDS—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Tuckey, J. F., Alberton, Ayrshire (2).										
Tregorland Ivoline ..	15594	4.10.35	15	9,176	3·83	351·05	350	Mature	192, 268, 357, 377, 381, 361, 396, 430	Bonnie Bloom of Gowrie Park
Tregorland Keswick ..	19079	8.10.35	8	9,363	3·80	356·24	350	Mature	279, 310, 341, 333, 373, 359, 324	Gowrie Park Scotchman
Vagg, E. J., Leongatha, Jersey (1).										
Bonnay Mystery's Lilac ..	Vol. 23	28.10.35	10½	3,453	6·04	208·67	230	Jr. 2	.. ..	Bonnay Love's Masterman
Van Brummelen, J. K., Notting Hill, Friesian (1).										
Bolero Sylvia's Venus ..	3874	31.10.35	39	12,857	3·40	437·47	350	Mature	320, 339, 566, 587	St. Alban's Queen's Korndyke 2nd
Vaughan Bros., Girgarre, Jersey (1).										
Lynroy Glady's 2nd ..	38462	11.10.35	16	8,195	5·51	451·55	350	Mature	372, 398, 398, 526	Sherborne Wyandotte's King
Wade, W. J., Stratford, Jersey (4).										
Aveley Marie Antoinette 2nd	25648	3.10.35	16½	10,119	5·28	534·10	350	Mature	536, 607, 595	Marc Antony of Aveley
Inverbroom Silvermine's Marie	44392	2.10.35	6½	8,633	5·27	455·06	270	Jr. 3	420 ..	Economist of Aveley
Inverbroom Silver Muriel 2nd	38483	17.10.35	20	9,193	4·56	419·46	350	Mature	346, 379, 433	Economist of Aveley
Empress 9th of Jerseyholm	21328	12.12.35	10	5,624	6·03	339·22	350	Mature	329, 406, 357, 442, 395, 452	Handsome Boy 5th of Melrose
Walker, C. S., Swan Hill, Friesian (1).										
Warwick Maggie Oakwood ..	C.R.	20.10.35	28½	10,925	3·01	328·36	290	Sr. 3	224, 323 ..	Greenvale Woodcrest Oakwood 2nd
Walker, C. S., Swan Hill, Jersey (7).										
Peri Vanilla 2nd	23367	25.12.35	15	5,732	5·53	316·85	350	Mature	220, 313, 299, 339, 266, 328, 299, 371	Peerless Eclipse of Meadowvale
Warwick Augustus Marie ..	38486	7.10.35	7	7,139	4·73	337·46	350	Mature	339, 433, 348, 379	Chevrolet of Banyule
Warwick Beauty 3rd ..	C.R.	19.10.35	13	6,495	4·01	260·57	270	Jr. 3	210 ..	Preston Star King
Warwick Bell Bird 3rd ..	C.R.	18.10.35	13	6,621	4·54	300·29	270	Jr. 3	.. ..	Preston Star King
Warwick Polly 2nd ..	46642	29.11.35	11	5,985	5·41	323·69	310	Jr. 4	227, 324 ..	Preston Star King
Warwick Pollyanna 2nd ..	46643	6.10.35	13	6,293	5·59	351·80	310	Jr. 4	275 ..	Preston Star King
Warwick Pollydorcus ..	42448	7.11:35	16	6,270	5·61	351·92	350	Mature	370, 358, 391	Warwick Hudson
Wallace, A., Kennington, Ayrshire (8).										
*Glen Cooee Vista ..	23829	26.11.35	4	5,835	4·12	240·69	350	Mature	224 ..	Fairy Prince of Glen Cooee
†Hyde Park Rita ..	28607	17.12.35	4	1,523	4·69	71·45	230	Jr. 2	.. ..	Oakbank Aristocrat
Spring Dale Buttercup ..	C.R.	9.11.35	4	4,603	4·48	206·19	250	Sr. 2	.. ..	Drayton Royalty
*Spring Dale Dainty Maid ..	27731	8.12.35	4	4,740	3·96	187·50	250	Sr. 2	.. ..	Spring Dale Dandy
*Spring Dale Doris ..	22081	21.12.35	4	6,045	4·16	251·49	350	Mature	299, 345 ..	Ben Kell Dainty Don
*Spring Dale Duchess ..	18938	11.12.35	4	4,995	4·02	200·85	350	Mature	297, 262, 266, 296, 297	Ben Kell Dainty Don
Spring Dale Flower ..	20754	16.12.35	14	6,461	4·04	261·06	350	Mature	241, 255, 301	Ben Kell Dainty Don
*Spring Dale Purity ..	27733	8.10.35	4	4,185	4·51	188·76	250	Sr. 2	.. ..	Spring Dale Dandy
Wallace, A., Kennington, Jersey (7).										
Grovelea Flower Queen ..	Vol. 23	9.11.35	6½	3,843	5·33	204·86	230	Jr. 2	.. ..	Mornmoot Monarch 2nd
Grovelea Jewel	Vol. 23	4.11.35	4	3,243	5·79	187·66	230	Jr. 2	.. ..	Mornmoot Monarch 2nd
Grovelea Pretty Morocco ..	Vol. 23	29.10.35	4	3,978	4·83	191·96	230	Jr. 2	.. ..	Preston Defender's King
Myall Dainty Miss ..	Vol. 23	3.11.35	4	3,917	4·93	193·24	230	Jr. 2	.. ..	Myall Ben
Myall Ruby	Vol. 23	5.11.35	4	4,365	4·70	205·37	230	Jr. 2	.. ..	Kyora Foch
Preston Busy Bee ..	38501	6.11.35	4	6,452	4·27	275·58	350	Mature	232, 286, 290	Preston Pretty Boy
Preston Dawn Maid ..	45759	10.11.35	6½	5,381	4·86	261·29	290	Sr. 3	.. ..	Kyora Mayflowers' Fancy
Warragul High School, Warragul, Red Poll (6).										
*Gipps Barbara	3120B	15.10.35	4	5,220	4·15	216·39	330	Sr. 4	230, 166, 293	Woodburn Laureate
Gipps Ginerva	3655A	4.11.35	9½	5,576	3·88	216·32	310	Jr. 4	198, 220 ..	Gipps Byron
Gipps Marcelle	4629A	31.10.35	7½	4,238	4·34	183·91	230	Jr. 2	.. ..	Naranghi Wizard
Gipps Marie	2878A	8.12.35	N.O.C.	7,575	4·04	306·34	350	Mature	241, 209, 412	Woodburn Laureate
*Gipps Winga	7128	29.10.35	4	2,310	4·88	112·80	230	Jr. 2	.. ..	Naranghi Wizard
*Gipps Zora	2883A	21.11.35	4	8,100	3·74	303·19	350	Mature	237, 266, 370	Woodburn Laureate
West, J. C., Notting Hill, Illawarra Shorthorn (2).										
Grange Lea Birdie ..	11280	21.12.35	28½	8,096	4·09	331·26	270	Jr. 3	305 ..	Parkview Guardsman
Grange Lea Elsie ..	11284	27.10.35	28½	8,430	4·04	340·35	230	Jr. 2	.. ..	Parkview Guardsman
White, R. T., Cardigan, Ayrshire (4).										
Ayrvale Primrose ..	28052	17.11.35	21	6,783	4·15	281·47	230	Jr. 2	.. ..	The Valley Bandolier
Ayrvale Sylvia	24568	15.10.35	17	9,018	3·83	345·83	330	Sr. 4	250, 265, 372	Sparrovale Sir Percy
Ayrvale Trixie	24569	5·11·35	11	7,893	3·68	290·10	290	Sr. 3	254, 270 ..	Sparrovale Sir Percy
The Valley Pavlova ..	26772	17.10.35	17	8,973	3·48	312·22	310	Jr. 4	278, 322 ..	The Valley Bandolier

* 240 days in test. † 120 ays in test.

STANDARD HERD RECORDS—*continued.*

Name of Cow.	Herd Book No.	Date of Calving.	Milk last day of Test. lb.	Milk. lb.	Average Test.	Butter Fat. lb.	Standard required.	Class.	Previous Yields of Butter Fat.	Sire.
Williams, F. A., Bamawm Extension, Jersey (2).										
Leven Brae Daisy Grey ..	28924	24.10.35	15	8,207	5·22	428·55	350	Mature	309, 382, 438, 532, 436, 452	Twylish Fox of Colac
Taranah Ruby 2nd ..	42120	30.9.35	10½	5,192	5·38	279·32	310	Jr. 4	280, 335 ..	Duke of Invermay
Wilmot, J., Pootilla, Jersey (1).										
Uphaven Silvermine 3rd ..	Vol. 23	22.11.35	13½	4,156	5·53	229·79	230	Jr. 2	.. ..	Banyule Airpoise
Wood, J. V. M., Heidelberg, Jersey (6).										
Clarendon Eyre Dorothy ..	46868	10.12.35	22½	7,992	5·41	432·51	270	Jr. 3	405 ..	Clarendon Eyre Golden Dreamer
Clarendon Eyre Dorothy 2nd	Vol. 23	22.10.35	20	6,873	5·35	367·87	230	Jr. 2	.. ..	Victorious Pioneer (Imp.)
Clarendon Eyre Fauvette ..	47618	16.12.35	19½	6,596	5·65	372·95	270	Jr. 3	307 ..	Glenesk Eminent's Leon
Clarendon Eyre Happy Days 3rd	Vol. 23	2.10.35	24	6,967	5·32	370·72	230	Jr. 2	.. ..	Clarendon Eyre Oxford Observer
Clarendon Eyre Love Lies 2nd	43387	5.11.35	20	6,887	5·26	362·19	270	Jr. 3	327 ..	Rochette's Golden (Imp.)
Lily Christabel (Imp.) ..	33958	3.10.35	25	10,230	5·41	553·79	350	Mature	360, 469, 456	Oxford Sultan's Observer

Tubercle Free Herds

The following herds have been declared free of tuberculosis under the scheme conducted by the Department of Agriculture. Under this scheme a tuberculosis-free accredited herd of cattle is one in which the entire herd has passed two negative, successive, annual physical examinations and tuberculin tests, or, upon disclosure of infection, three semi-annual, successive physical examinations and tuberculin tests applied by a State Veterinarian or by a qualified and registered veterinarian who is approved by the Chief Veterinary Inspector for that purpose.

ACCREDITED TUBERCLE FREE HERDS.

Herd Number.	Name.	Address.	No. in Herd.	Herd Number.	Name.	Address.	No. in Herd.
1	State Research Farm	Werribee ..	259	6	Lady Talbot Milk Supply Company	Cranbourne ..	418
2	Warragul High School	Warragul ..	35				
3	Payne, A. E. T. ..	"Yarra View," Lilydale	80	7	Mailer, Dr. Ramsay ..	"Maneroo," Shepparton	92
4	Dennis, Mrs. A. A. ..	Frankston ..	14	8	Reid, Ralph G. ..	"Holmwood," Koo-wee-rup	99
5	Slaney, H. B. ..	Mornington ..	85				

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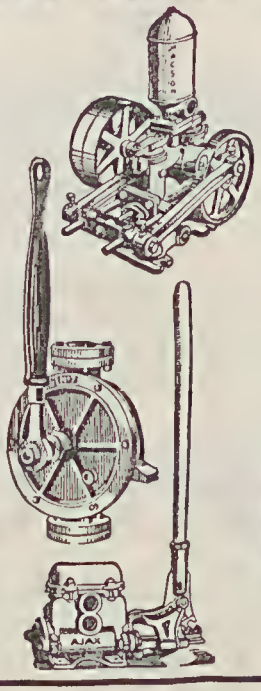

The "Macson" (*top illustration*) is a powerful double-acting Piston Pump, that will pump up to 100 lbs. pressure or 250 ft. elevation. A fine pump for irrigation or general water supply. Sizes range from 1¼ to 3 inches, with prices from £15 to £48.

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"Ajax" Double-acting Low Down Lift and Force Hand Pump (*lower illustration*). The long handle and cog-gear give great leverage and reduce power required to operate. For general pumping, spraying, irrigation. Size 1¼ inch. Capacity 500 gallons per hour. Price £3/17/6.

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Dried Vine Fruits

Production and Processing

By Messrs. D. G. Quinn, Special Horticultural Instructor, D. D. Brown and R. Roberts, Orchard Supervisors.

DURING the past decade, radical changes in field work, dipping and the subsequent processing of dried vine fruit have raised the quality and status of the Australian article greatly, and assisted further by preferential tariffs, these improvements have steadily increased the outlet for Australian produce so that, except in years of abnormal production, the fruit can be cleared at satisfactory prices.

Improved modes of dipping have gradually enhanced the natural keeping quality of the sultana—the old storage trouble "sugaring" being less evident at the present time. The introduction of the "Showell" and paraffin oil processes has reduced this fault still further and, to a certain extent, has curtailed the serious storage losses due to the larvae of the dried fruit moth, although the general use of the volatile insecticide ethyl formate must be given the greatest credit for assisting in this latter direction. Even so the keeping quality of Australian dried fruit is not perfect and experiments are being conducted, both in the matter of drying green procedure, and packing shed processing, so that it is reasonable to predict that the Australian pack, a few years hence, will be superior to the standard considered satisfactory to-day. This is highly desirable in order to consolidate the large trade we have been privileged to build up under the shelter of the Empire preference policy.

In 1907 Australia produced 7,200 tons of sultanas, currants and lexias; in 1933, 78,000 tons; the average production from the area now planted being estimated at 65,000 tons. As the local Australian market will absorb only 14,000 tons, the balance of the crop has to be marketed overseas in competition with Greece, California, Smyrna, Crete, South Africa, Persia, &c., where southern European and coloured vineyard labour is used almost entirely. The matter of organized marketing is handled by the State Dried Fruits Board and Export Control Board, who direct the disposal of the fruit, while the Department of Commerce fixes and controls grading. The Australian Dried Fruits Association acts in an advisory capacity to these bodies.

The relative importance of our overseas markets is somewhat as follows:—Great Britain, 30,000 to 45,000 tons; Canada, 16,000 tons; New Zealand and the East, 5,000 tons. In these markets we are favoured by tariff preferences against foreign competitors. If we reflect that

ACREAGE AND AVERAGE PRODUCTION—MILDURA DISTRICT.

Variety.	Mildura and Irymple.		Red Cliffs.		Merbein.		District Total.	
	Area.	Average Yield per Acre.	Area.	Average Yield per Acre.	Area.	Average Yield per Acre.	Area.	Average Yield per Acre.
	acres.	cwt.	acres.	cwt.	acres.	cwt.	acres.	cwt.
Sultanas	5,993	22·0	4,563	30·7	8,000	31·9	18,556	27·8
Currants	2,502	27·2	1,000	35·0	1,447	37·9	4,949	31·4
Lexias and Walthams	1,273	27·4	1,050	34·6	495	32·8	2,818	31·1

Typical dipping and drying scenes in a dried fruit area.

all our overseas trade depends on the policy of Empire reciprocity, and these preferential tariff treaties are costing our overseas customers more than half a million per year, it behoves us to aim at producing as high a quality sample as possible. In this regard, whereas most growers take a pride in their production, there are still some who are somewhat lax in their methods, basing their view on the fact that the extra money received for the higher grades of fruit is not worth the extra care necessary for its production.

Looking into the future we may predict that as the quality of the article rises, and as further reciprocal treaties are negotiated, the large areas in Australia available for the production of dried fruit may be utilized. However, in view of the comprehensive drainage schemes nearing completion and other cultural activities which will gradually produce higher yields per acre, leading marketing authorities consider that no immediate expansion of the irrigated dried fruits area is justified.

The observations contained in the following article are submitted with the object of indicating points of technical interest to dried fruit producers.

Mildura.

Mildura, the principal dried fruit centre of Australia, produces from an area of 26,323 acres, approximately 55 per cent. of the total Australian pack.

The acreage of each variety grown in the Mildura district and the average production per acre for the eleven years' period ending 1935, are shown in the accompanying table.

Standardization of Dips.

Until 1922 the only dip in use was the boiling caustic dip which produced a brown-coloured sultana. This did not compare favorably with the light golden sultana of our overseas competitors. Prior to 1929, various dips were being used experimentally by growers, who used their own formulae. About this time the Council for Scientific and Industrial Research investigated the dipping practices, and recommended that a "mixed" dip be adopted and standardized. This standard mixed and the cold dip are the two now in general use. Growers also are using certain proprietary lines. No hard and fast rule can be laid down with regard to the type of dip to be used, and local conditions at the time of dipping must be taken into account.

In the absence of accurate figures from the growers, it is difficult to arrive at a percentage of the various dips used, but from the classification of fruit at the shed doors the following assumption has been put forward :—

> Standard or mixed dip, 51 per cent. ; cold dip, 42 per cent. ; and hot caustic dip, 7 per cent.

Dip Formulae.

The *standard or mixed dip* is made up as follows —

To 50 gallons of water, add 2½ lb. of potassium carbonate in which 1½ pints of olive oil have been emulsified. An additional quantity of this mixture will form a very useful stock solution. Allow 1½ lb. of caustic soda per 50 gallons. Heat to a temperature of 180° F. and test by dipping sultanas. Add additional caustic soda (¼ lb. at a time) until slight cracks appear on the berries. The dip is then ready for use at 177 to 183° F.

All necessary additions to the volume of the dip must be made by adding stock solution. Increases in volume usually necessitate additions of caustic soda, until the berries show slight cracking again.

The appearance of the fruit should at all times be taken as a guide to the concentration of caustic soda. If over cracking, decrease concentration by adding stock solution. If under cracking, add caustic soda (¼ lb. to 50 gallons) until cracks are in evidence.

In preparing the *cold dip*, mix carbonate of potash and water at the rate of 1 lb. to 2 gallons, until the required volume of solution is obtained. Add olive oil emulsion, equivalent to 1½ pints of oil to 50 gallons of solution. (The oil is emulsified by agitation in a 1 per cent. solution of potassium carbonate).* Test by immersing the fruit for four minutes. If efficient, the bloom will be wholly removed, an oily coating being substituted. If however, the solution is found to be unsatisfactory, add oil emulsion progressively, at the rate of 1¼ pints of oil per 50 gallons of water, until an effective test is obtained.

Before dipping the fruit, add an *excess* of emulsion equivalent to 1½ pints of olive oil to 50 gallons dip solution. This prepared cold dip can be used until slight traces of bloom appear on the dipped fruit. When this occurs an excess of emulsion must be added as was the case just prior to dipping. Additions of potassium carbonate are made as a solution at the original strength of 1 lb. to 2 gallons of water, further testing and additions of oil emulsion being necessary before using. The fruit should be sprayed with cold dip solution at the third day, and thereafter at intervals of three or four days. A special spraying should be applied during or immediately after rainfall.

A ditching plough.

Ditching plough at work.

It is essential that growers have plenty of rack room when using the cold dip, as it takes about two days longer, on an average, for the fruit to dry thoroughly, compared with the standard or mixed dip.

Green Tinge.

As many growers have had their fruit rejected on account of green tinge, a word or two on the question of its elimination should not be out of place. One suggestion for overcoming this defect is to use a temperature dip for the first filling and then as the fruit becomes more mature, to change over to the cold dip. Where the green tinge is apparent, a thorough washing of the fruit, as soon as it is knocked down from the racks is necessary. This wash is made up as follows:—add 1 lb. of potash and 1½ pints of olive oil to 50 gallons of water. After washing, the fruit is spread out thinly on the hessians to dry.

If uniform results are to be obtained, a few general rules must be observed. Fruit should be spread out as soon as practicable after dipping, keeping in mind that any drippings falling on to grapes will discolour them. Quick drying improves quality, therefore, effective dipping and thin spreading are essential. Removal, and particularly bundling of partially dried fruit, invariably result in a multi-coloured sample, due to

* Any oil which floats on surface of the emulsion should be discarded.

Buried cuttings improve the soil condition.

deterioration of individual berries to a varying degree. Bleaching of cold dipped fruit should precede the final washing, as otherwise regulation of moisture content is not possible.

Cultural Notes.

The old method of clean cultivation has given way to the later practice of growing green cover crops, burying of cuttings in specially prepared ditches, and controlled weed growth, when the soil moisture is not required by the vines.

The new method, it is claimed, causes the vines to root more freely and deeply and increases the activity and range of the soil flora. Where this method of ditching and green manuring has been carried out for some years, it has been noted that the effect is progressive—the physical condition of the soil and the growth and productivity of the vines improving continuously.

Superphosphate is used liberally in these areas. It is mainly applied to stimulate heavy leguminous cover crops. When these crops are turned under the improvement is marked, whereas if superphosphate is applied without a green crop any beneficial result is not so obvious. Some successful growers replace 1 cwt. of superphosphate for every ton of green fruit harvested.

Swan Hill.

In the Swan Hill irrigation area, which includes Tresco, Woorinen, and Nyah, there are approximately 660 growers of sultanas on 5,500 acres. Production in 1933 and 1934 almost reached the peak figure of 7,000 tons which was obtained during the 1930 season while in 1931, 1932, and 1935, the crops were depleted by black spot, floods, and frost respectively. The potential yield of the vines seems to remain approximately the same.

The past season's crop was 1,400 tons short of the peak year, notwithstanding the fact that the district now comprises a slightly larger sultana area than it did in 1930. This is due undoubtedly to the 1934 frost and the irregular development of fruiting wood following this damage. When one considers that the end of November, and the beginning of December, is the usual time of sultana bud differentiation, and that, at the beginning of November, most of the vines in the Woorinen area, and a considerable number of those in the Nyah district, were burnt black with frost, it is remarkable how they recovered. The yield, as was to be expected, was very erratic, some vines carrying the maximum number of buckets, while adjoining ones carried practically none. A peculiar feature was the heavier bearing of the frosted vines compared with those which apparently had escaped damage. No individual block, as a whole, bore a very heavy crop, yet it was very noticeable, that the well-cared-for block bore much better than the one neglected in any phase of the work, indicating how regular attention after the frost had helped the vines to recover.

The fruit weighed in fairly heavily, baumés were not unusually high, and the size and quality of the berries and bunches were the best ever produced in the district. Deliveries at the largest district shed of 30 per cent. four and five crown grade, 60 per cent. three crown, and 10 per cent. two crown, give an indication of the qualities processed.

Dipping was pleasant work this season. The weather was exceptionally fine, dry, and free from duststorms. Approximately 80 per cent. of the growers used the standard mixed dip (caustic, olive oil, and potash, 185° ± 2°). Indications are that this dip will be used even more extensively during future seasons. If dipping be carried out at the proper temperatures, the standard dip is capable of producing high quality fruit, although it has a relatively rapid drying rate. The remaining growers used the straight caustic, or "Johnson's Dip." With the lighter

crop, plenty of rack space, and good fruit, growers felt they could, and should, dip at the lowest possible temperatures, in all hot dips, to obtain quality. Only one large grower used the cold dip with very fine results. The district is usually ten days behind Mildura in bud burst, and subsequent maturation, which means a vital ten days less of drying season, making the cold dip a risky proposition here unless the grower has ample rack space, or is fortunate enough to strike fine weather. Some trouble was experienced with green tinge in the hot dips through the fruit drying out in five to seven days, instead of the usual twelve to fourteen days, and some of the earlier deliveries were refused at the shed doors on this account. This was however eliminated by spraying the fruit while on the ground with the standard dip stock pot solution, using one gallon of the mixture to a sheet.

Spraying and Cultural Work.

Considering the severe strain to which the vines were subjected during the 1934 frost, the season has been satisfactory, and growers have, at least, realized that all phases of vine culture are so inter-related, that neglect, or delay, of one, may have a deleterious effect on the health of the vineyard. As a result they are striving to organize, regulate, and time their work to enable the vines to withstand better any severe conditions, or recover from them more quickly.

One of the worst troubles experienced at Woorinen is black spot, the spread of which is helped, no doubt, by the excessive and prolonged growth made by the vine in this district. During 1931, 60 per cent. of the crop was lost through the ravages of this disease, and very thorough measures are now adopted for its control. As many as seven sprayings have been applied in one season. Usually four sprayings are carried out before the end of October, followed by a late mid-November berry cover spray, in which arsenate of lead is incorporated to combat the caterpillar of the light-brown apple moth. Careful growers apply another spray in December, which in some years is very necessary. Most growers are aware of the disastrous results which accrue from the neglect of properly-timed early sprays, and fewer growers each year are being caught unawares by black spot. The feeling is expressed in the district that the more judicious use of water will control excessive growth, and ultimately help to keep the disease in check.

Soil types in the Woorinen district vary greatly, and are known and expressed by the growers as numbers, arising out of a soil survey conducted some years ago by the Council for Scientific and Industrial research. The principal types comprise, No. 1 pine ridge country of which there are only 70 acres; No. 7, heavy sandy loam; No. 8, free open soil, with a high percentage of silt, and low clay content; No. 9, grey alluvial soil, with a uniform heavy sub-soil, with no lime content; and No. 10, river silt of varying depths. Nyah and Tresco are more in keeping with Mildura country, with light to heavy sandy and clay loams. Most growers are keen students of these soil types, and are steadily adjusting their irrigation methods to obviate the errors of over or under watering parts of their holdings.

Growers in the Swan Hill district have formed an investigation committee called the Nyah and Woorinen Inquiry Committee, which has purchased a block from the Closer Settlement Commission, on which tests and demonstrations are carried out. Last season the Council for Scientific and Industrial Research, in conjunction with this Committee, conducted dipping trials with 26 different variations of the principal dips in use. The dipped fruit, after being split up into different shed treatments through the courtesy of the Woorinen Packing Co., will be stored, and the keeping and selling qualities compared. Various green manure crops have been sown on the plot, and the influence of the burial of cuttings, to open and improve the soil, help water penetration and conservation, is being demonstrated. In addition, further experiments are being carried out on various blocks throughout the district in co-operation with the Council for Scientific and Industrial Research. These comprise manurial trials, drainage and soil bore tests, currant disbudding and topping tests, and cincturing trials with different tools at different blossoming periods. Field irrigation observations, and frost tests with oil and briquette heaters, to determine which is the most efficacious, and the number required per acre, are in progress also.

In an attempt to improve the standard of pruning of all varieties of vines grown in the district, a pruning competition was commenced this season among growers by the Department of Agriculture in conjunction with the local Inquiry Committee, with very promising results.

Orchard and Garden Notes

By Edward E. Pescott, F.L.S.

The Flower Garden.

THE end of the year is always a very busy time in the garden. All plantings of annuals for autumn flowering should now cease; any further plantings, except late Marigolds, would be too late.

The next work is the planting of Dahlia tubers and Gladiolus corms. In both cases the soil should be very well dug over before planting, and some old manure worked a few inches below; if desired, some bone and blood fertilizer may be used instead.

Gladiolus corms should be set about two inches below the surface in heavy soils and three inches in light soils. If the corms have begun to shoot the shoot should be placed upright in the soil.

Dahlia tubers are given a very shallow placing; their position in the soil is immaterial; what matters is the position of the shoot; this should be perfectly upright; the tuber may be horizontal but that will not matter. Stakes should be driven in before planting so as to avoid the chance of injuring the tubers. All Dahlias and Gladioli should be given abundant and regular waterings.

The Vegetable Garden.

Where herbs are in full flower, the flowers and floral leaves should be cut off and dried. Drying should be done in the shade, as direct sunshine will release too much of the oil content. After the cutting, the plants should be well watered, so that they may quickly produce a second growth.

Rhubarb and Asparagus beds should be now well manured and watered. All Asparagus cutting should have ceased at the beginning of the month.

There may be a series of Tomato plants in the garden for early and late producing crops.

In the home garden it is wise to stake the plants, and the outside shoots should be pruned as they occur. Too many sideshoots reduce the fruiting abilities of the plants. Tomatoes are very voracious feeders, and they can hardly be overfed with manure; neither can they be overwatered in summer. Tomatoes should really be forced. So should all melons, pumpkins, marrows, cucumbers and the like; they certainly respond willingly to abundant manuring and watering.

Cactus Dahlia.

The Orchard.

There are two subsidiary agencies in the Codling moth attack that are now urgent. The first is the lure pot, which is hung in the centre height of the tree and which is filled with a 10 per cent. solution of malt vinegar in water. To this the moths are attracted, and are thus caught.

It is not generally considered that the catching of the moths is a primary aid in checking the attack; it is almost certain that some are trapped before egg-laying. But their presence in the lures is an indication as to the abundance or otherwise of the moth population of the orchard; and an abundance indicates the peak period, when no effort should be spared to keep the fruit covered and protected.

The second agency is the presence of bands on the trees. All trees should be banded by the beginning of December. Before banding, the bark should be well scraped so that there may be no hiding places other than in the crevices or corrugations of the bands. Chemical bands need be tied on with wire only when bird attacks are feared. Magpies give more trouble than any other birds.

Hessian bands should be well folded, and in hot weather should be examined weekly for larvae.

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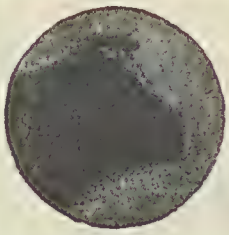

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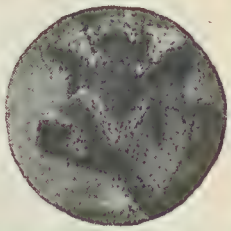

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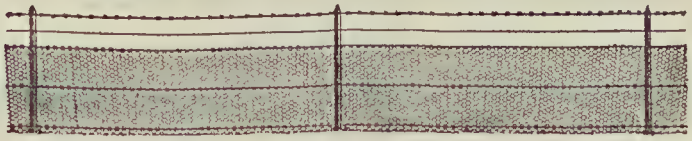

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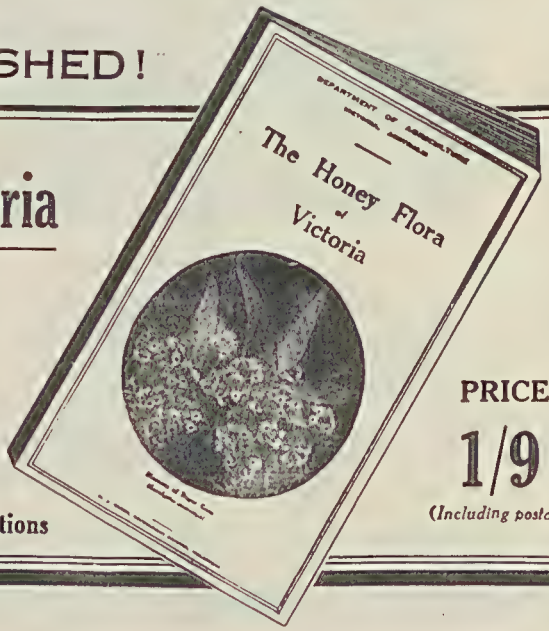

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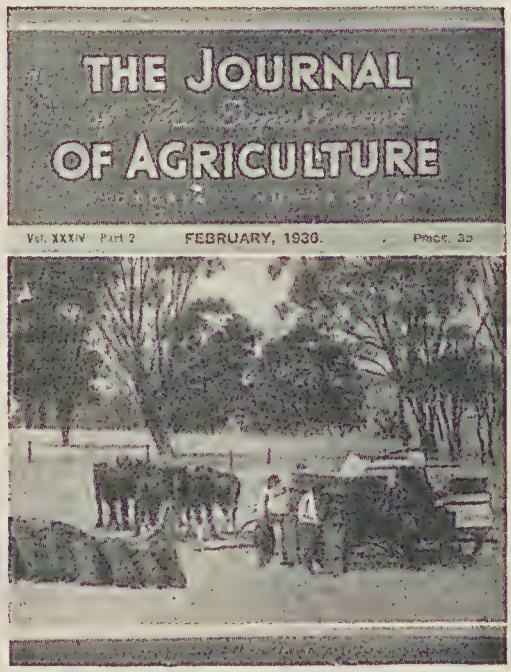

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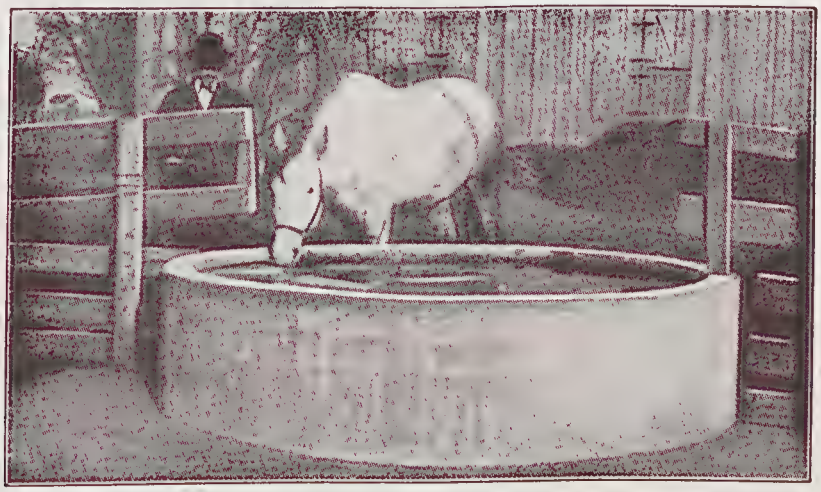

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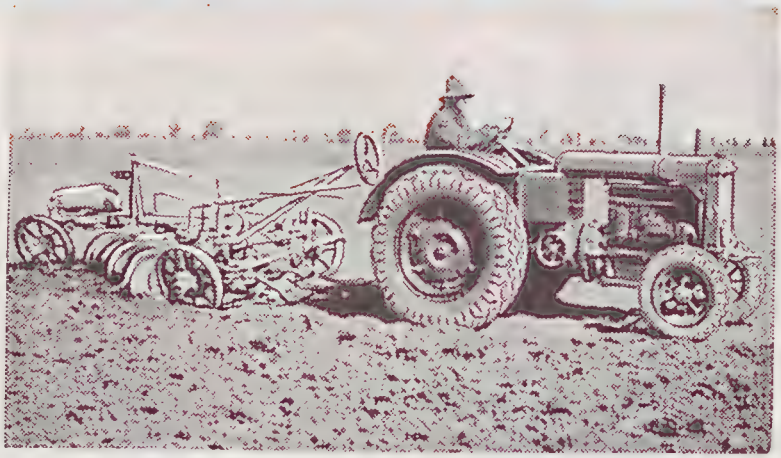

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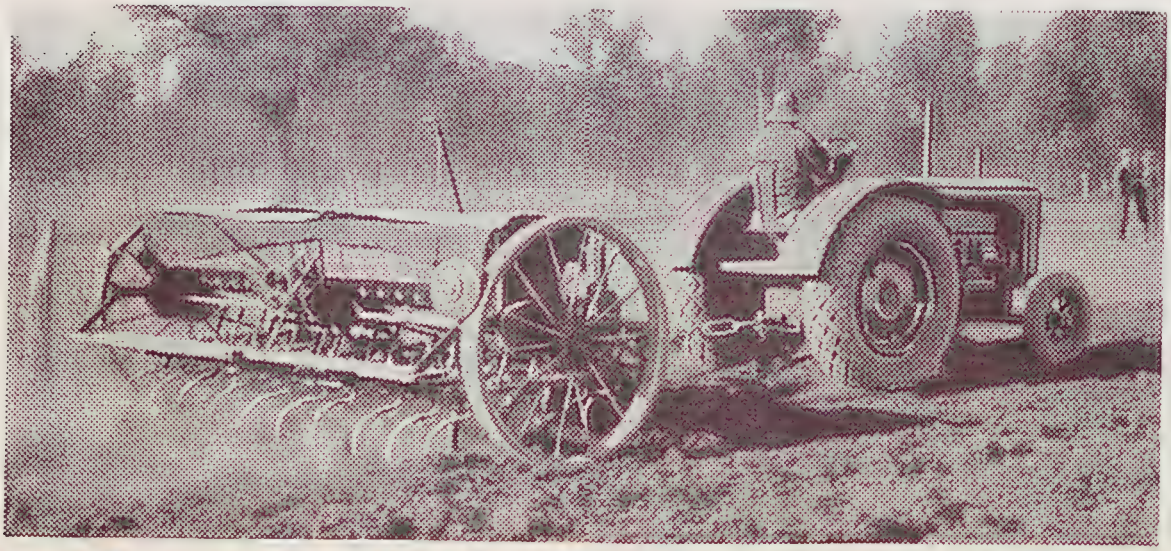

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HON. E. J. HOGAN, M.L.A.,

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